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GROWTH AND TRADE LIBERALISATION IN AUSTRALIA. A VAR ANALYSIS

by
NEIL DIAS KARUNARATNE *

1. *Introduction*

The recent move towards more open trade policies in Australia, after decades of protection has sparked off a lively debate about its prudence from the standpoints of both timeliness and economic rationale. The proponents of open trading support the recent policy initiatives directed at reducing the average effective rate of protection on manufacturing from the current levels of about 20% to about 5% by the year 2000. Based on CGE (Computer General Equilibrium) model simulations it is estimated that liberal trade policies will lead to a permanent direct annual increase of 0.5% ($1.5 billion) in GDP terms. Moreover the indirect benefits in the form of a reduced regressive tax burden and positive dynamic externalities are claimed to far outweigh these direct GDP benefits (Industry Commission, 1991, p. 2). Several commissioned reports strongly support the push towards openness and contend that the Australian economy has stagnated in the past because of its inward looking policies. Conversely, the North-East Asian economies have made spectacular progress by pursuing open or export oriented trade policies (Garnaut, 1989; Hughes, 1989). The deregulation of the financial markets and the floating of the Australian dollar in 1983 has also exposed the deep seated structural malaise and an uncompetitive manufacturing sector bequeathed by the legacy of past protection. In its halcyon days protection to manufacturing industries drew support from the need to diversify the economic base and encourage European immigration by offering high real wages. The Brigden report (1929) captur-

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ed the rationale for protection and gave it an air of respectability through the celebrated Stolper-Samuelson (1941) theorem.

Australia's legacy of protection runs counter to the dominant message of the pure theory of international trade. Pure theory emphasises cogently that free trade or openness would maximise national and global welfare. Any restrictions of trade are shown to be Pareto inefficient or sub optimal. Partial equilibrium analysis shows that protection in a small country or a price taker such as Australia would result in national welfare losses due to production and consumption inefficiencies. These are depicted by the Harberger triangles (areas b and d, Figure 1). Proponents of openness in trade argue that besides the static welfare losses, protection would undermine positive externalities and dynamic benefits of free trade. Their arguments run as follows: (1) Protection drives a wedge between domestic and international prices and misaligns the exchange rate causing economy wide misallocation of resources. (2) Protection by insulating the domestic economy from the winds of competition weakens the pressure to adopt best practice technology, quality control, management techniques and work techniques. In this regard the manifest uncompetitiveness in the TCF (Textile, Clothing and Footwear) and PMV (Passenger Motor Vehicle) industries of Australia has been blamed on the legacy of protection. (3) More openness is argued to confer economies of scale by enabling production for a larger world market rather than a narrow domestic market. (4) Protection puts a premium on rent-seeking lobbying to perpetuate protection rather than invest in R&D to promote innovation. (5) Protection, from a general equilibrium perspective blunts the competitive edge of the productive industries by making intermediate inputs costly and by distorting the incentive structure in the economy. Accordingly, the proponents of openness advocate the expeditious dismantling of protection or the establishment of a "level playing field" so as to allow the invisible hand or market forces to be the prime movers of resource allocation and growth in the Australian economy.

The opponents of openness or "the level playing field" argue that these policies are based on unrealistic neoclassical theory as expounded in the Heckscher-Ohlin model and its associated theorems. They further contend that support for export orientation vis-a-vis import substitution is based on two-sector models (Bhagwati, 1988) that are congenitally biased against strategic trade policies. It has been demonstrated recently that even a three sector generalisation refutes the bipolar policy prescriptions that favour export promotion policies vis-a-vis strategic trade policies as pursued by some North-east Asian economies (Liang, 1992). Strategic trade policies emphasise that comparative advantage depends on economies of scale,

product differentiation and market imperfections and these are not endowed by nature but rather have to be created by interventionist policies (Krugman, 1986).

A game-theoretic version of strategic trade policy illustrates that targeting domestic firms by providing them with government subsidies can deter entry of potential rivals and transfer oligopolistic rents from rivals to the domestic economy (Brander & Spencer, 1985). However, these strategic policies are essentially "beggar thy neighbour" policies which break down if rivals retaliate. Partial equilibrium analysis demonstrates that in a second best world riddled with market failure, protection yielding job creation is preferable to inaction. For example, in the current context of high unemployment job creation could cause the marginal social benefits (area e, Figure 2) to exceed the welfare losses due to protection (areas b and d, Figure 2). However, it can be shown on specificity grounds that there are always superior alternative instruments to protection that could tackle market failure more efficiently. For example, a production subsidy would lead to a smaller welfare loss shown by the production inefficiency (area b) and would be preferable to protection which causes a greater welfare loss (sum of areas b and d, Figure 2). But, it can be argued that subsidies are also inefficient because of their perverse economy-wide effects. Therefore the policies to rectify market failure should be enunciated from a macro per-

FIG. 1. Welfare loss due to a tariff.

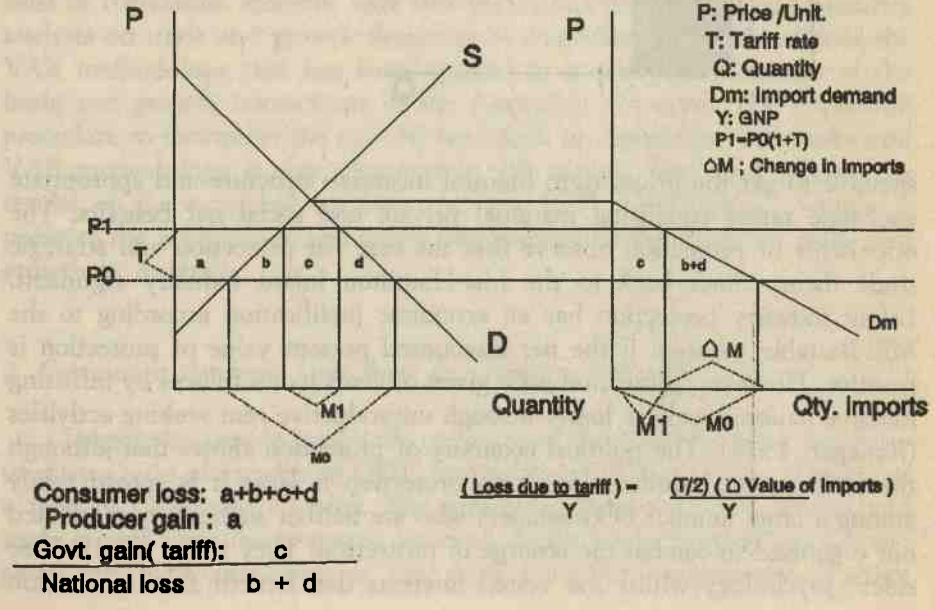
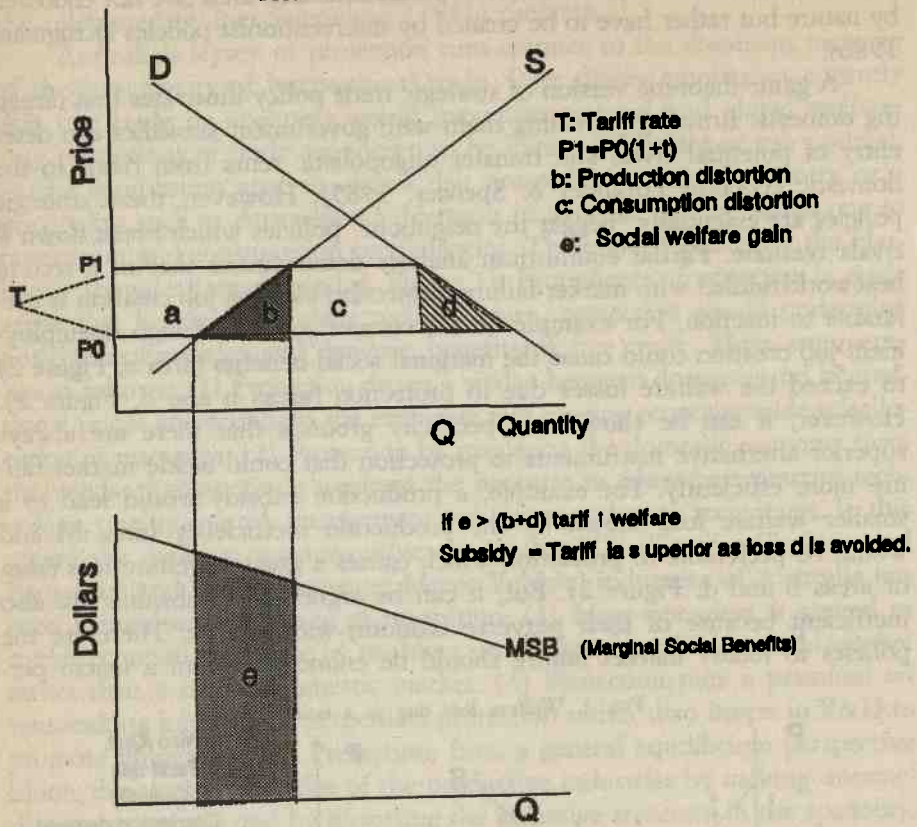


FIG. 2. Welfare effects of a subsidy.



spective to get the prices right (neutral incentive structure and appropriate exchange rates) equalising marginal private and social net benefits. The opponents of protection observe that the case for protection and strategic trade theory dates back to the List-Hamilton infant industry argument. Infant industry protection has an economic justification according to the Mill-Bastable theorem if the net discounted present value of protection is positive. However, protection once given outlives its usefulness by inflicting massive national welfare losses through unproductive rent seeking activities (Krueger, 1974). The political economy of protection shows that although the total national welfare loss from protection is large it is spread thinly among a large number of consumers who are neither sufficiently motivated nor organised to combat the scourge of protection. They suffer from a "free rider" psychology whilst the vested interests that benefit from protection

are well organised and cogently articulate the case for the perpetuation of protection through the Manufacturing Council and the Trade Union lobbies in Australia (Pappas et al., 1990).

The aim of this study is to review the pros and cons of trade liberalisation against the empirical results from causality testing and VAR innovation modelling. The introduction, Section 1, shows that plausible theoretical arguments support both the case for and against openness. Therefore, using a multivariate framework the trade growth nexus for Australia is analysed to examine the implications of the move towards trade liberalisation. The variables used for the empirical investigation are: growth of GDP (Y_t), trade variables such as exports (X_t), imports (M_t), competitiveness or the terms of trade as measured by the ratio of the price of exports to imports (P_x/P_m), and proxies for growth of factor inputs such as capital (K_t) and labour (L_t). The study covers the period 1959Q3-1992Q1 and uses published historical quarterly time-series from the Australian Bureau of Statistics (ABS, 1988, 1991). The study uses the vector autoregressive (VAR) methodology in preference to the conventional simultaneous equation (SEM) framework to analyse the dynamic interactions between growth and trade variables. The VAR methodology is more suitable than the SEM methodology because it does not require the use of an a priori theoretical framework to examine the pros and cons of trade liberalisation policies. The remainder of the paper is structured as follows: Section 2, reviews the results of correlation analysis, unit root tests and bivariate Granger causality analysis on trade and growth dynamics in Australia. Section 3 outlines the VAR methodology that has been applied to analyse the dynamics of the trade and growth interactions in the Australian economy. The sequential procedure to determine the optimal lag length to implement the constrained VAR methodology is also discussed in this section. Section 4 reports the results of the empirical validation of the VAR methodology. Section 5 presents the conclusions and policy implications of the study for trade and growth in Australia.

2. *Correlation Analysis, Unit Root and Granger Causality Tests*

During the sample period the openness of the Australia economy measured as a ratio of exports to GDP doubled from 11% to 22%. Imports as a ratio of GDP also doubled. The correlation between GDP growth and trade growth variables (exports, imports), factor inputs (capital and labour) show very high coefficients of over 0.90. Only the competitiveness proxy

TABLE 1

CORRELATION OF GROWTH AND TRADE VARIABLES

Var	y_t	x_t	m_t	k_t	p_t	l_t
y_t	1.00					
x_t	0.96	1.00				
m_t	0.97	0.97	1.00			
k_t	0.96	0.91	0.93	1.00		
p_t	0.10	0.01	0.12	0.09	1.00	
l_t	0.94	0.97	0.97	0.89	−.04	1.00

y_t: Real GDP. x_t: Value of Exports. p_t: Terms of Trade. k_t: Capital. l_t: Labour.

failed to show a significant positive correlation with the other variables in the system (Table 1). These correlation results are consistent with similar regression results for a large number of economies at various stages of development. Some studies assert that trade has acted as an engine of growth (Michaely, 1977; Michaely et al., 1991; Salvatore and Hatcher, 1991; Mosochos, 1989; Michalopoulos and Jay, 1973; Balassa, 1989;

TABLE 2

ADF UNIT ROOT TEST RESULTS ($n = 130$)

Log Var	ADF–test	min–AIC	lags	Q (df)
$\ln y_t$	−1.94	−557.79	4	1.26(2)
$\ln x_t$	−2.91	−337.83	4	5.87(2)
$\ln m_t$	−1.32	−336.31	5	3.39(2)
$\ln p_t$	−2.07	−372.60	8	8.48(4)
$\ln k_t$	−2.05	−514.85	8	4.85(4)
$\ln l_t$	−1.85	−527.26	5	4.46(1)
α=.05	−2.89			X^2=5.99

Tyler, 1981; Feder, 1983; Kavoussi, 1984). However, the time-series studies referred to above are econometrically flawed because they are not based on stationary series and the cross-section studies assume invariant parameters across countries. Nonstationarity in time-series data can lead to spurious correlation and regression results (Engle and Granger, 1987) and also the simple correlations fail to provide insights on the direction and strength of causalities (Granger, 1980).

As a prelude to the application of Granger causality analysis and the VAR methodology each of the six variables in the system were tested for stationarity using the Augmented Dickey Fuller (1989) (ADF) unit root test. The ADF test results indicate that all the log transformed variables are non-stationary or are integrated order I(1). Also all except the variable p_t have white noise residuals according to the Ljung-Box Q statistic (Table 2). Therefore, they have been log-differenced to induce stationarity and convert them to integrated order zero I(0) or stationary variables.

The direction of causality between two variables could be tested using the Granger causality tests. A variable X_t is defined to *Granger cause* a variable Y_t, notated $X_t \Rightarrow Y_t$, if the prediction of the value of Y_t based on its own history can be improved by using the history of X_t (Granger, 1969). The past values of X_t Granger cause Y_t if the F-test for the past X_t values are jointly significant (this is asymptotically equivalent to a log-likelihood ratio test). The thirty results for the bivariate Granger causality tests are reported in Table 3.

Studies for economies such as Canada, Austria, UK and USA (Eshafahani, 1991; Kunst and Marin, 1989; Sharma et al., 1991) fail to support the hypothesis that exports act as an engine of growth in those countries. Cross sectional studies for developing countries also fail to lend conclusive support to the export causing growth hypothesis (Jung and Marshall, 1985). But, studies for the newly industrialised countries (NICs) confirm that exports cause growth and growth causes exports indicating that there are significant feedback effects between trade and growth (Chow, 1987).

The bivariate Granger causality tests for Australian data reject the null hypothesis that exports did not cause growth of GDP during the review period (Table 3). Besides, the Granger tests reveal that capital formation and labour inputs had significant uni-directional causal effects on the growth of GDP. The null that terms of trade do not Granger cause exports and imports is also rejected indicating that Australia's trade performance is susceptible to the fluctuations in the terms of trade. The terms of trade are a proxy for competitiveness because they have a stable relationship with the real exchange rate during the review period (Blundell-Wignall and Gregory,

TABLE 3

BIVARIATE GRANGER CAUSALITY TESTS

Null Ho:	F (df)	Null Ho:	F (df)
P => Y	2.35 (1,108)	L => X	1.13 (2,110)
K => Y	5.41* (3,108)	P => X	3.22*(1,110)
X => Y	6.87* (1,108)	K => X	0.59 (1,110)
L => Y	3.82* (1,108)	M => X	1.30 (1,110)
M => Y	0.29 (1,108)	Y => X	0.69 (1,110)
K => M	1.43 (2,101)	M => P	2.36 (1,111)
X => M	1.40 (4,101)	X => P	0.05 (1,111)
P => M	6.09* (1,101)	K => P	0.22 (1,111)
W => M	0.59 (2,101)	L => P	0.54 (1,111)
Y => M	0.99 (2,101)	Y => P	0.46 (1,111)
P => K	2.47 (2,104)	X => L	3.33*(1,111)
Y => K	3.82* (1,104)	Y => L	0.08 (1,111)
L => K	3.40* (1,104)	M => L	0.22 (1,111)
X => K	0.01 (1,104)	P => L	0.01 (1,111)
M => K	0.86 (2,104)	K => L	0.91 (1,111)

* A critical value of 3 (approximately 5% level of significance) has been used for rejection of no causality null.

1990). Growth of GDP appears to have caused variations of inputs such as capital and labour as hypothesised in the accelerator model (Samuelson, 1939) rather than the neoclassical growth accounting model (Solow, 1957). These uni-directional causal effects, notated by $\Rightarrow$, are summarised in column (1) Table 4. The indirect causality occurs through a process of transitivity. If x causes y and y causes z, then x causes z indirectly and is notated as $x \rightarrow z$. The Granger causality tests indicate that exports indirectly caused capital formation through growth and competitiveness caused growth

TABLE 4
UNI-DIRECTIONAL, INDIRECT & BI-DIRECTIONAL CAUSALITIES

Impacted Variable (Direction)	Direct Causality (=>) (Col.1)	Indirect Causality (->) (Col.2)	Two-way Causality (<=>) (Col. 3)
y_t	x_t=>y_t,k_t=>y_t, l_t=>y_t		
x_t	p_t=>x_t	x_t=>k_t via y_t	
m_t	p_t=>m_t		
p_t		p_t=>y_t via x_t	
k_t	y_t=>k_t		y_t<=>k_t
l_t	l_t=>x_t	l_t=>y_t via x_t	

through exports (Col. 2, Table 4). Finally, the Granger tests also indicate bi-directional causality or feedback effects between growth and capital formation and these symbiotics are notated as $y \Leftrightarrow k$ (Col. 3, Table 4).

3. *VAR and Optimal Lag Length Determination Methodology*

The Granger bivariate causality tests indicate the direction of causality between two variables. However, to gain insights on the degree of strength and causal interactions between trade and growth variables it is necessary to use a multivariate framework. The conventional approach for multivariate analysis is based on the Cowles Commission's simultaneous equation models (SEM) (Goldberger, 1964; Johnston, 1984; Judge et al., 1985). However, the SEM approach has been criticised on several grounds. First, it imposes incredible zero restrictions based on the econometrician's judgement to achieve identification of the model equations. Second, variables are dichotomised into endogenous and dynamically independent exogenous in an arbitrary manner. Third, the inclusion of expectation variables creates identification problems. The alternative to SEM favoured for this empirical analysis is the vector autoregression or the VAR methodology (Sims, 1980; Bernanke,

1986) which overcomes the deficiencies listed above. VAR appears to qualify for the empirical analysis of the trade growth controversy in the Australian context as it is atheoretic by nature. Therefore, the VAR methodology allows the empirics to reveal the dynamics that govern the trade growth nexus in Australia untrammelled by preconceived theory.

The implementation of the VAR methodology is predicated on the use of covariance stationary processes. For the empirical analysis of the trade growth dynamics a six component vector is defined: $z(t) = (y_t, x_t, m_t, p_t, k_t, l_t)$. Each component defines a covariance stationary process.

The matrix representation of the general VAR model using the matrix polynomial $A(L)$ takes the following form:

$$A(L)\, z(t) = U(t) \tag{1}$$

where $A(L) = I - A_1L - A_2L^2 - \ldots - A_kL^k$ and L is the lag operator such that $L^k z = z_{1-k}$ and I is an identity matrix. Each parameter matrix A_i, $i = 1, 2, \ldots, k$, has dimension 6×6. $U(t)$ is vector of (errors). However, the parameters estimated from model (1) defy succinct interpretation and are difficult to understand from a theoretical viewpoint (Sims, 1980). The way out of this impasse is through the conversion of the VAR model (1) into an equivalent moving average (MA) reduced when invertibility conditions hold (Granger and Newbold, 1977) as shown below:

$$z(t) = A^{-1}(L)\, U(t) = B(L)\, V(t) \tag{2}$$

The covariance matrix of the reduced form $\Sigma = V(t)\, V(t)'$ is contemporaneously correlated and intertemporally uncorrelated. The process orthogonalisation overcomes the above problem by defining a triangular matrix P with unit diagonal so that $P\Sigma P'$ becomes a diagonal matrix with white noise processes $PV(t)$ (Judge et al., 1985). The elements of the orthogonalised covariance matrix of the reduced form disturbances play a crucial role in the identification and estimation of the VAR model. The matrix polynomial $B(L)$ defines the impulse response matrix and its coefficients measure the dynamic response of endogenous variables $z(t)$ consequent upon a unit change in innovations (measured by one standard deviation) emanating from a specified endogenous variable (Sims, 1982). The triangularised innovation matrix traces out in a recursive Wald causal chain the shock movements (Todd, 1990). The VAR system after orthogonalising can be stylised as:

$$z(t) = B(L)\, V(t) \tag{3}$$

This study has used RATS software which uses the Choleski factorisation

technique to orthogonalise the variance covariance matrix based on $V(t)$.

Furthermore the representation (3) facilitates the decomposition of the $(k + 1)$ steps ahead FEV (forecast error variance) associated with each endogenous variable. The total innovations generated by an endogenous variable on itself and other variables in the system can be regarded as proportional to the FEV. These FEVs describe fundamental economic forces, orthogonal by construct, that cause the endogenous variables $z(t)$ in the system to shift over time (Myers et al., 1990).

This study uses the constrained VAR methodology for the empirical analysis of the interactions between growth and trade variables in Australia. The minimum Akaike (1970) Information Criterion (AIC) has been used in several studies to choose the optimal lag length of the polynomials in $B(L)$ (Judge et al., 1985; Cheung et al., 1991; Sharma et al., 1991; Darrat, 1988). The AIC criterion achieves an optimal trade-off between the risks of imposing a shorter lag and a longer lag with a larger variance (Hsiao, 1981). The procedure of lag length restriction was initiated by pre-specifying a lag length of 12 periods for each variable. Having determined the optimal own lag length using the minimum AIC criterion and the Ljung-Box Q statistic for white noise residuals, the remaining variables in the system were added sequentially using the specific gravity criterion (Caines et al., 1981). The VAR analysis is extremely sensitive to the order in which variables are incorporated in the polynomials. The maximum value of the specific gravity criterion (or the reciprocal of the minimum AIC) specifies the next variable that qualifies for inclusion in the bivariate polynomial relationship. The optimal lag length of included variables are determined on the basis of the AIC criterion. The above sequential procedure can be extended to the n-variate plynomials to select optimal lag lengths until the VAR system is fully specified.

4. *Results of Validation of VAR Model*

The VAR polynomials are all expressed in terms of stationary variables. Stationarity for the time series variables used in the study was achieved by taking the four period log differences of the quarterly data. The data used for growth, trade and factor inputs in the vector $z(t)$ were all obtained from published Australian Bureau of Statistics historical time-series (ABS, 1988, 1991). The optimal lag lengths of the polynomials were derived using the sequential procedure enunciated by Hsiao (1981). The polynomials for the restricted VAR model for growth, exports, imports,

TABLE 5

POLYNOMIALS FOR THE RESTRICTED VAR MODEL

$$\begin{bmatrix} y_t \\ x_t \\ m_t \\ p_t \\ k_t \\ l_t \end{bmatrix} = \begin{bmatrix} B_{11}(L)^5 & B_{12}(L)^1 & B_{13}(L)^3 & B_{14}(L)^2 & B_{15}(L)^1 & B_{16}(L)^1 \\ B_{21}(L)^5 & B_{22}(L)^2 & B_{23}(L)^1 & B_{24}(L)^1 & B_{25}(L)^1 & B_{26}(L)^1 \\ B_{31}(L)^7 & B_{32}(L)^2 & B_{33}(L)^4 & B_{34}(L)^1 & B_{35}(L)^2 & B_{36}(L)^1 \\ B_{41}(L)^5 & B_{42}(L)^2 & B_{43}(L)^1 & B_{44}(L)^1 & B_{45}(L)^1 & B_{46}(L)^1 \\ B_{51}(L)^7 & B_{52}(L)^2 & B_{53}(L)^2 & B_{54}(L)^1 & B_{55}(L)^1 & B_{56}(L)^2 \\ B_{61}(L)^5 & B_{62}(L)^1 & B_{63}(L)^1 & B_{64}(L)^1 & B_{65}(L)^1 & B_{66}(L)^1 \end{bmatrix} \begin{bmatrix} y_t \\ x_t \\ m_t \\ p_t \\ k_t \\ l_t \end{bmatrix} = \begin{bmatrix} V(1) \\ V(2) \\ V(3) \\ V(4) \\ V(5) \\ V(6) \end{bmatrix}$$

terms of trade or competitiveness, factor inputs capital and labour are reported in Table 5. The constrained VAR model with optimal lag lengths denoted by superscripts has the general form from the restricted model: $B(L)\,z(t) = V(t)$.

The expanded form of the constrained VAR is reported in Table 5. The parameter estimates associated with the variables in the VAR model are misleading (Sims, 1980) and therefore they are not reported.

The above specification of the constrained VAR model was used to determine the causal strengths amongst the growth and trade variables. For this purpose the behaviour of innovations generated by each variable was analysed using variance decompositions obtained through FEVs.

The FEVs were calculated by the Choleski factorisation method using the RATs computer algorithm (Doan, 1989). The variance decomposition divides the forecast error variance (FEV) of a given variable according to the causal strength of the innovation effects of the variable on itself and other variables in the system. An optimal forecast occurs when the highest amount of innovations by the variable is accounted for by itself. The magnitude of the FEV provides an estimate of the Granger causal strength of the innovating variable on other variables in the VAR system (Sims, 1980; 1982). For the purpose of this empirical analysis the strength of the causal effects have been classified on a percentage basis into low, medium and high. Variance decomposition for 12 and 24 periods ahead forecasts were calculated to capture the full dynamics of the trade and growth nexus that operated in the Australian economic system and the results are reported in Table 6.

The variance decompositions indicate that innovations in growth are

TABLE 6

DECOMPOSITION OF FORECAST ERROR VARIANCE (FEV)
STRENGTH OF CAUSALITY

Lag	y_t	x_t	m_t	p_t	k_t	l_t
12 y_t	90.25	0.27	1.33	0.44	7.30	0.41
24	93.53	0.16	0.81	0.43	5.05	0.12
	High	Low	Low	Low	Medium	Low
12 x_t	3.33	87.72	7.93	0.06	0.24	0.81
12 m_t	1.70	16.30	79.82	0.08	1.27	0.83
24	6.09	20.96	68.65	0.15	1.18	2.97
	Medium	Medium	High	Low	Low	Low
12 p_t	0.02	0.09	0.53	99.28	0.04	0.04
24	0.08	0.18	0.54	99.11	0.05	0.05
	Low	Low	Low	High	Low	Low
12 k_t	24.24	0.64	11.00	0.21	63.89	0.02
24	35.63	1.25	8.87	0.22	54.00	0.03
	High	Low	Medium	Low	High	Low
12 l_t	27.28	7.26	0.37	0.34	0.94	63.81
24	51.13	13.54	0.99	0.99	0.58	33.44
	High	Medium	Low	Low	Low	High

Classification of the strength of causality.
$0 < 5\%$: Low causality.
$5 - 30\%$: Medium causality.
$30\% >$: High causality.

explained by more than 93% of its own FEV. GDP growth innovations have only a low causal effect on the growth of exports accounting for only 3% of its FEV. However, GDP growth innovations appear to have high causal effects on factor inputs such as capital formation and labour accounting for more than 35% and 51% of their FEVs, respectively. The GDP growth effects on capital formation are consistent with the accelerator principle (Samuelson, 1939). Innovations in growth appear to have an unusually high causal leverage on labour. Accordingly we could conjecture that a growth recession would cause a severe downturn in labour inputs. The causal effects of export growth on GDP growth appear to be surprisingly low during the review period. They account for only 0.16% of the GDP growth FEV. Nearly 85% of innovations of the export growth is

explained by its own FEV. Export growth innovations had only medium level causal effects on both imports and labour inputs accounting for about 21% and 14% of the FEV respectively. The causal effects of innovations in exports on growth, capital formation and the competitiveness are revealed to be very low. Innovations in imports accounted for nearly 69% of its own FEV and had medium level causal impacts on exports and capital formation accounting for nearly 9% of the FEV of each of them. The innovations of the competitiveness proxy accounted for more than 99% of its own FEV and had very low causal effects on other endogenous variables in the system. Innovations in capital formation accounted for 54% of its own FEV and had medium level causal effects on growth as it accounted for more than 5% of the growth FEV. Capital formation had low causal effects on other variables in the system. Innovations in labour inputs accounted for more than 33% of its own FEV and had very low causal effects on other system variables accounting for a very low percentage of their FEVs (Table 6).

The variance decomposition analysis clearly shows that during the review period exports were a very sluggish engine of growth. Besides, the reverse causality of growth acting as stimulus for exports was also very weak and therefore the perceived feedback effects or symbiotics between exports and growth were very fragile during the study period. Overall the results support the claims by the proponents of active trade liberalisation that protracted protection had created a structural malaise that undermines the performance of the Australian economy. The neoclassical growth accounting model that posits that factor inputs such as capital and labour cause growth appears to receive support during the review period.

5. *Policy Implications and Conclusions*

The VAR empirical results reveal that weak causalities and dismal dynamics undermined GDP growth and trade performance of the Australian economy during the review period. The advocates of trade liberalisation have blamed the protectionist legacy for these dismal dynamics and have emphasised the need for rapid trade reform to capture the magic of trade led growth as enjoyed by the North-east Asian economies. However, given Australia's poor trade growth dynamics it is necessary to be cautious about the responsiveness of economic growth to trade liberalisation policies.

The effectiveness of trade reform can be sharpened by complementing it with microeconomic reforms. The *One Nation Statement* (Keating, 1992)

sets out some of the complementary microeconomic reforms that have to be undertaken to make the Australian economy internationally competitive. They include: 1. Infrastructure upgrading (ports, aviation, roads). 2. Removal of labour market rigidities caused by outmoded work practices and rent seeking behaviour of unions. 3. Tax reform so as to remove the disincentives on investment and innovations geared to trade. 4. The removal of institutional bottlenecks, administrative delays and bureaucratic inertia.

In the current environment of macroeconomic instability as evidenced by the record unemployment rate of over 11%, the burgeoning current account and fiscal deficit, trade liberalisation is likely to have adverse transitory adjustment effects on both the unemployment rate and the twin deficits. In the past official reports recommended that trade reforms should be postponed or slowed down during periods of macroeconomic instability (Jackson et al., 1975; Crawford et al., 1979). However, international experience indicates that successful trade reform and macrostabilisation can proceed in tandem (Krueger, 1990). Moreover, countries that have pursued vigorous trade reform programs have been more successful in generating sufficient growth (Dornbusch, 1992). Steadfast trade reforming countries have generated sufficient revenue to overcome the twin deficits more effectively than countries that have prevaricated on trade liberalisation (Thomas and Nash, 1991). Nevertheless, international experience suggests that the magic of trade reform should not be oversold because of its asymmetric growth effects. The lack lustre performance of trade liberalisation policies in the short-run can lead to disenchantment and undermine the credibility of reform policies (Rodrik, 1992). Openness in trade provides at best an environment enabling to nurture international competitiveness provided macroeconomic instability is not a major stumbling block.

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CRESCITA E LIBERALIZZAZIONE DEL COMMERCIO IN AUSTRALIA. UNA ANALISI VAR

Questo articolo cerca di chiarire la controversia sulla liberalizzazione del commercio in Australia analizzando empiricamente la dinamica della crescita del commercio per il periodo campione 1959-III 1992-I usando un modello VAR. Si fa inoltre una analisi di correlazione e si presentano dei test Granger per determinare la direzione della causalità. I risultati empirici indicano che la performance economica dell'Australia è stata viziata da deboli rapporti causali tra commercio e crescita nel periodo in esame. Questo sembra mostrare l'opportunità di una rapida riforma del commercio. Ma la debole dinamica insita nell'economia australiana e gli effetti asimmetrici di politiche di apertura sulla crescita non lasciano spazio all'ottimismo. Sono indispensabili riforme microeconomiche complementari perché le riforme del commercio abbiano un impatto significativo sulla crescita economica. Nel breve periodo i costi di aggiustamento della liberalizzazione del commercio possono comportare instabilità macroeconomica in una economia che già soffre per la debole dinamica di crescita commerciale. Perciò il mito della liberalizzazione del commercio non deve essere eccessivamente sbandierato perché vi è il rischio che crei problemi insuperabili relativamente alla credibilità politica.

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FOOD PRICING AND IMPORTATION POLICIES IN AFRICA'S AGRICULTURAL DECLINE

by
ROBERT H. WESSEL *

Today the standards of living of most countries in sub-Saharan African have fallen below the levels that prevailed when they achieved independence in the 1960's. Their combined GDP of $150 billion for over 500 million people is about the same as that of Belgium with its population of only 10 million. It is not surprising that by the summer of 1990 many observers viewed the condition of these nations as desperate. Between 1980 and 1989, sub-Saharan Africa's performance was the worst in the Third World with real GDP per capita declining 1.2 percent per year on the average. The situation is especially deplorable in agriculture where Africa was once a net exporter of food. Recently, production per capita of agricultural products has been falling in most countries in the sub-Saharan region and starvation is only averted by massive food imports [1]. Production is 20 percent below the level achieved in 1970 although population has doubled in the intervening years. What is more even with protracted foreign aid, the situation is becoming worse.

Causes of Africa's Decline. – Many factors explain the decline in food output as well as overall production. Obviously, war is one. Another is corruption and incompetence of public officials [2]. The Berg report pointed out that nationalist feelings at the time independence was achieved and a lack of private capital induced an excessive growth of public sector enterprises which took on responsibilities they were unable to manage effectively [3]. Droughts also played a devastating role. In some parts of Zimbabwe,

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[1] AYITTY (1992).

[2] WORLD BANK (1981).

[3] *Ibid.*

for example, not even grass grew for over a year. But natural and manmade disasters have not been confined to Africa. They have also been experienced in both eastern and southern Asia where GDP per capita grew by 6.2 percent and 3 percent respectively from 1980 to 1989. Only in Africa has the hardship increased as food output along with GDP per capita declined. As the World Bank has recognized, while war, drought and the oil crises account for part of the difference, the primary cause of Africa's economic distress was misconceived economic policies. Rather than improving and diversifying the agricultural sector they tried to industrialize at a time when much of the world already was moving toward a post-industrial stage. The result can be seen in many "castles in the desert" [4]. Massive food imports consequently became unavoidable.

Our concern here focuses on two factors: the way the prices of food are determined in sub-Saharan Africa, and the conditions under which the importation of food into sub-Saharan Africa takes place. We seek to learn the role they have played and may be playing in the worsening of the food production crisis as well as the acceleration of general economic decline.

Artificially Low Food Prices. – A particularly harmful practice of many Socialist regimes in Africa was the imposition of very low price ceilings on farm products to appease urban populations. This, however, usually made agriculture so unprofitable that many farmers left their farms and migrated to already overcrowded cities [5]. The folly of this practice was recently demonstrated in Kenya where the government maintained artificially low prices on cereals while allowing fertilizer costs to skyrocket. As a result, many farmers are not planting maize and wheat [6]. Zambia had a similar experience. The Kaunda regime there, to appease urban areas, also kept food prices abnormally low. This both depressed food production in the countryside and encouraged rural residents to come to the cities. The population of Lusaka increased ten-fold as a result [7]. This type of foolish policy was unfortunately widespread.

Giving Away Food. – In 1990, 2.7 million tons of food aid was provided to sub-Saharan Africa. About half was handed out free. It is estimated that 30.5 percent of the total was emergency aid, of which 15.9 percent went to refugees and 3.7 percent was given to vulnerable groups [8]. When widespread starvation looms, there are no alternatives to handouts.

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[4] World Bank (1989a).
[5] World Bank (1989b).
[6] *Miami Herald* (1993).
[7] Morrow (1992).
[8] I.M.F. (1992).

The victims of civil war in southern Sudan and Angola as well as Mozambique and Somalia are all cases in point. Although most experts agree that unconditional gifts should be limited to extreme conditions, practical considerations make restricting their use difficult. In addition, there is a significant lag between the widespread perception of the need and the subsequent delivery of food. Frequently, therefore, the real emergency has already passed before food distribution begins. This can damage the markets for domestic farm products thereby hurting local farmers, and reducing future production capabilities. It may also make local governments and populations dependent. This happened in both western Sudan and northern Ethiopia in 1985 [9].

Substantial donations of free food frequently stem from the domestic problems of food donors rather than charitable motivation. Agricultural producing nations often have elaborate systems of subsidies and controls which frequently lead to the buildup of large surpluses. The European Community's CAP, common agricultural policy, as well as the price supports and resultant surpluses of the U.S. Department of Agriculture are obvious cases where official generosity is motivated in part by the desire to dispose of excess supplies. Unrestricted free food shipments to dependent areas provide an opportunity to appear altruistic while unloading surplus crops.

Dumping. – Closely related to overly generous give-away programs is the practice of selling surplus food products to poor African nations at artificially low prices. The injury inflicted on African producers is of the same nature and can be as severe as that which results from excessive gifts of free food. It is paradoxical that at the same time that the European Community is spending more than $9 billion per year on programs to help Africa both feed and develop itself, such destructive counter initiatives are allowed to go on [10].

A case in point is the dumping of EC beef on West Africa. The beef in question is fatty and not prized by European buyers. It is, however, accepted by Africa's hungry consumers. This beef is very profitable for farmers in the EC because subsidies are based on fat content. The program although ostensibly justified by African poverty is really designed to advance the interests of rich European farmers. Ghana and Côte d'Ivoire, where most of the beef is dumped, are not major cattle producers but normally obtain their supplies from farmers in Chad, Sahel and Burkino

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[9] *The Economist* (1993b).

[10] KILLICK (1986).

Faso. Most farmers in these areas have given up attempting to sell in their former markets because beef dumped by the EC brings such low prices. European beef costs less than half that produced in Sahel-Mali. For example, a good cut of French beef in Abidjan sells for about $2 a pound while the same cut produced in Sahel costs $5. Live cattle from Sahel, which accounted for two-thirds of the beef consumed in the Ivory Coast in 1975, by 1990 amounted to only 25 percent of the total. European beef exports to the Ivory Coast increased about seven-fold over this period. African farmers are in reality the victims of systematic over production of food in the EC, which is subsidized by Europe's taxpayers to benefit the politically strategic farm lobby. To add to the paradox, the EC is spending substantial sums to support the very cattle farmers the dumping injures. It is even harder to justify because this very harmful policy from Africa's point of view is providing a market for a very small part, less than .5 percent, of Europe's beef production [11]. Paradoxically, no African government has mounted serious opposition to this policy.

Conditions Tied to Gifts. – The conditions under which aid is extended can also influence the benefits provided. At present, about half of the cash contributions require that the funds be expended on the products or services of the country making the gift. Since the goods or services involved are frequently priced above competitive levels, recipient countries regularly lose from 15 to 20 percent of the value of the gifts.

The pattern of aid distribution among developing countries and areas also often produces odd results. For example, the richest 40 percent of the population receives more than twice the aid per capita as the poorest 40 percent. Those with the worst population problems seemed to receive the least aid [12]. In addition, nations that spend most aid on the military get more per head than those that devote the most of their gifts to social welfare [13].

It is clear that the way gifts are distributed can have important effects, both good and evil, for the recipient country. Mishandling of food distribution can often negate the beneficial influence of other development programs. There are important advantages to be realized from coordinating and rationalizing the various efforts being made by a donor in a developing area. Trade policies also should be evaluated for the role they may play in the overall African assistance programs. Only in this way can self-defeating, conflicting policies be avoided.

[11] *The Economist* (1993c).

[12] COCHRANE and FAIRD (1989).

[13] *The Economist* (1993d).

Clearly, the distribution of aid among recipient nations should be based significantly on need. Nations that can and are attracting significant private capital need less and ought to get less external funds. Tying gifts to the purchase of donor nations' goods should be avoided. Projects must be selected for their real substantive value not as showpieces. Where food must be given, the following arrangements may be useful.

Market Sales. – One way to deal with this problem is to sell food on local markets and use the funds generated thereby for developmental ventures. This can work fairly well if the quantity sold is limited so that prices are not unduly depressed and resultant damage to the local agricultural economy is minimal. Over one-third of Africa's food assistance of 2.7 million tons in 1990 was distributed in this way.

Food-for-Work. – This approach has the advantage of avoiding the development of dependence on foreign aid by local populations. Care must be taken that the really needy can perform the tasks involved. Otherwise, those who are most robust and least need food will be the primary beneficiaries. In coping with last year's drought in Zimbabwe, Food-for-Work was used to motivate the people to prepare for the next planting time by undertaking light infrastructure projects. Seed and food packets passed out as part of the program enabled half of Zimbabwe's population to survive and provided enough seed to plant the next crop [14]. With Food-for-Work projects, care also must be taken to avoid so much food importation that local farm markets would be flooded.

Eritrea's transitional government used Food-for-Work programs to start rebuilding the country on its own. They put most citizens to work digging small dams to trap rainfall, planting trees and building terraces in return for basic rations of cooking oil and grain. The country's soldiers built roads for their rations. These efforts so far have been a success [15].

Cash Distribution. – When this is employed, the local agricultural economy is uninjured and food is distributed through normal market channels. Also, cash can be disbursed more quickly than food products. Clearly, the advantages are most fully realized in economies where free markets exist and food is readily available. It fails to meet the needs of more primitive societies where markets are functioning poorly or subject to more complete regulation. Further, it would not meet the need when food shortages are so serious that ample grain is not available locally. Botswana has been able to use this approach because of its well-developed market system. Obviously,

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[14] LARCH (1993).

[15] *The Economist* (1993a).

this formula does not appeal to donors bent on dumping domestic surpluses. Certainly cash distributions place a heavier burden on donor nations in most instances. Rather than unloading surpluses that do not have ready markets, budget allocations of scarce funds must be made. Developing nations must be realistic and face the fact that this approach can mean a reduced quantity of aid.

A number of suggestions for improving the distribution of aid have been made. Foremost among them is the appeal that policies be coordinated and not pursued in splendid isolation. This will not occur automatically and is unlikely to happen on donor initiative. Rather international agencies, especially African organizations, must actively press to bring this about. They must make their voices heard above the other competing interest groups in the EC and the U.S. Congress. Experience has shown that rigorous and unrelenting diplomacy can on occasion achieve significant results even in Africa. Needless to say, the pricing of agricultural products must reflect market forces and not the desires of particular pressure groups.

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CONTROLLO DEI PREZZI DEI PRODOTTI ALIMENTARI E POLITICHE D'IMPORTAZIONE NEL DECLINO DELL'AGRICOLTURA AFRICANA

La produzione di derrate alimentari nell'Africa sub-sahariana è diminuita drasticamente sì da rendere necessarie massicce importazioni per evitare che la sua crescente popolazione muoia di fame. In alcuni paesi, prezzi controllati eccessivamente bassi hanno provocato questo declino. In altri, il dumping dei prodotti alimentari da parte dei paesi sviluppati, sopratutto della Comunità Europea, hanno fatto perdere ai produttori africani i loro mercati. Doni di prodotti alimentari hanno pure ridotto la capacità dell'Africa di essere autosufficiente. È necessario che si eliminino i controlli sui prezzi e che vengano esercitate pressioni politiche perché cessi il dumping. Sono pure necessarie misure affinché agli aiuti alimentari corrispondano prestazioni lavorative e le derrate importate vengano vendute sui mercati africani.

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GROWTH, EFFICIENCY AND REFORM IN CHINESE INDUSTRY: REVIEW AND ASSESSMENT

by
YANRUI WU *

1. *Introduction*

The relationship between growth and efficiency is a subject of continuing interest. It is argued that China achieved respectable growth rates in the last decades but the economic gains came at a very high cost in terms of investment and labour input (World Bank, 1990b). In other words, industrialization in China has been based mainly on a massive infusion of centrally mobilized resources, with little concern for efficiency (Meier, 1989). Lack of efficiency has been a major constraint to the further growth of the economy. The principal objective of the economic reform of the 1980s is to improve on past growth performance and to do so largely through an increase in efficiency.

This paper reviews and assesses some key issues relating to industrial growth, efficiency and reform in China. Section 2 presents a brief review of industrial development over the last decades. The growth of rural industry in recent years is highlighted as well. Section 3 explores the issues associated with industrial growth and efficiency in the context of international comparisons. Section 4 summarizes some key policy changes of the reform and their relation to efficiency performance in the industrial sector. Section 5 elaborates the changes in the production pattern since the inception of the reform and the remaining problems in the post-reform period. Finally, Section 6 concludes the paper.

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2. *Industrial Growth in China*

Growth over the Last Forty Years. – China, though large, has been predominantly a rural society for a long time. In 1953, for instance, the industrial sector only generated about 19 percent of the gross domestic products (GDP) in the economy, in comparison with the agricultural sector's 68 percent (H. Wu, 1993). China has been active in developing a modern industrial sector. The development program started following the 1949 revolution. As a result, economic recovery and industrial development were rapid during the early 1950s which basically covered the period of the first Five Year Plan (1953-1957). During this period, a system of national economic planning was established which almost exactly mirrored the Soviet model (Lardy, 1978). In this model, price fixing, resource allocation and investment decision-making were all in the hands of state bodies, while the enterprises received increasingly detailed production plans. The whole process of industrial administration became extremely centralized and bureaucratic, with less and less scope for market forces to operate within the system.

While the success of the first Five Year Plan (FYP) laid a solid foundation for subsequent development, economic planning was about to be swept aside by a wave of absurdly over-optimistic projections and policies following the Great Leap Forward (GLF) movement of 1958. The Great Leap Forward, an attempt to accelerate economic development by achieving a massive rise simultaneously in grain, rural and urban industrial outputs, caused extensive resource dislocation in the economy (Feuchtwang, Hussain and Pairault, 1988). Although it had some success, the result of the movement was an industrial stagnation as well as a major economic recession during the period of 1958-1962. Industrial income (GDP), for example, only achieved an average growth rate of 4.9 percent per annum during this period, in comparison with 14.2 percent during the first Five Year Plan period. Meanwhile, the gross domestic product of the whole economy on an average had a negative growth rate of 3.4 percent during the same period [1].

Not surprisingly, the early 1960s were years of industrial consolidation and recovery. During the three years of 1963-1965, industrial GDP had been growing at an average rate of 18 percent per annum (H. Wu, 1993). But in 1966 Mao launched the Cultural Revolution (CR). Industrial development was disrupted and slowed down once again. During the ten years of the Cultural Revolution (1966-1976), industrial income (GDP) actually had

[1] These growth rates are calculated from data estimated by H. Wu (1993).

negative growth rates in 1967, 1968 and 1976. It was the death of Mao in 1976, shortly afterwards followed by the downfall of the "Gang of Four", that allowed the emergence of a new leadership and subsequently comprehensive economic reform policies. Since then, the Chinese economy as well as the industrial sector has been steadily growing at an average rate of about 10 percent per annum in real terms. Today, China is a rising industrial power whose economy displays many features of a modern economy. Industry is now the largest sector in the economy in terms of output value, although agriculture continues to dominate in employment.

Challenge of Rural Industry. – While promoting the construction of a modern industrial sector, China is also interested in the development of a rural industrial sector. Although the development program originated in the late 1950s has been interrupted over time due to political chaos and policy instability, it has gradually gained wide support in the 1980s as the economic reforms deepened. Rural industry is now the fast-growing sector in the economy [2]. For example, it has been reported that on average rural industry has been growing at a two-digit real rate over the last decade [3].

Many factors contributed to the rapid growth of rural industry [4]. The most important one is the rapid accumulation of capital in the rural sector during that period. The accumulation of funds for investment in the nonagricultural activities was related to the unusual growth of agricultural incomes, which stemmed partly from the growth of agricultural production and partly from the increase in the purchase prices for agricultural products. This can be seen clearly in the amount of domestic savings in the rural sector, which increased from 5.57 billion yuan in 1978 to 56.48 billion yuan in 1985 (SSB, 1991, p. 295). It was the increase in capital input that stimulated rural industrial growth. Furthermore, the rural-urban isolation policies pursued for a long time by the Chinese government prohibited rural out-migration, and therefore the large army of surplus labour that emerged after the agricultural reforms had to be absorbed by the rural sector itself (Y. Wu, 1990; and Anderson, 1990). The direct result of this policy combined with the easy access to investment funds is the formation of an industrial economy in the rural sector [5].

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[2] Rural industry includes all industrial enterprises run by townships, villages, individuals and partnerships.

[3] Both ISLAM (1991) and Y. WU (1990) reported growth rates of about 30 percent.

[4] For survey papers about rural industrial development, see EC (1987), BYRD and LIN (1990), Y. WU (1990), FINDLAY, WATSON and Y. WU (1994) etc.

[5] The rapid growth of the rural industry can be interpreted in the framework of booming sector theory. For details, see Y. WU (1990).

With its rapid development and increasing significance in the economy, rural industry is now challenging the state industrial sector which has dominated the economy for nearly forty years. According to the latest statistics, the gross value of output (GVO) share of the rural industrial sector over the national industrial total increased from 11 percent in 1981 to 31 percent in 1991. The total employment in the rural industrial sector, on the other hand, increased to 58 million in 1991, which is greater than the total employment (45 million) in the state industry in the same year. Meanwhile, the GVO share of the rural enterprise sector as a whole over the national total rose from only 8.2 percent in 1981 to 26.4 percent in 1991, and the employment share from 6.8 to 16.5 percent during the same period (SSB, 1992). In 1981, the GVO of the rural enterprise sector was only about a third of the agricultural GVO, but in 1991 the former was 40 percent greater than the latter, with the first breakthrough point observed in 1987 (SSB, 1992, pp. 329 and 390).

Rural enterprises have taken a major role in the development of the Chinese economy. Rapid industrialization in the countryside has greatly changed the Chinese economic structure, as a result. It seems, as some economists have said, that the policy "surrounding the cities from the countryside" popular in Mao's era is coming back but not in the battle field this time (Findlay and Watson, 1991).

3. *Growth and Efficiency in International Perspective*

Unbalanced Growth. – In the development literature, it is well-recognized that growth proceeds at an uneven rate from sector to sector in the transitional economies (Syrquin, 1986). Historically, agriculture has often been instrumental in igniting growth, but eventually the leading role has shifted to other sectors, predominantly manufacturing. A sector is said to be a leading sector when its rate of growth exceeds the average rate for a period long enough to raise overall growth toward its rate and when it spreads its dynamism through substantial links to other sectors. However, sectoral interdependence imposes certain constraints which if violated may retard growth (Chenery et al., 1986).

The importance of maintaining a proper balance among economic sectors has been discussed by economists (e.g. Kuznets, 1966; and Meier, 1989). The economies that have fostered the development of agriculture through government investment and policy guidance have better growth performance than those that have stimulated industry and neglected agricul-

ture. Israel, Malaysia and Taiwan are examples of the first group and Argentina, Chile and Uruguay of the second (Syrquin, 1986). There is no doubt that China falls into the second group. This is clearly shown by international comparisons in Table 1 between China and other countries at the same stage of development as China is now. It should be emphasized here that these comparisons are subject to numerous conceptual and statistical problems. These problems have been discussed at length in the literature (e.g. World Bank, 1985b; and Chen et al., 1988a).

According to Table 1, the production pattern in terms of GDP shares is atypical in China by comparison with those in other countries. On the one hand the shares of agriculture and infrastructure in the total production in China are similar to those of other low-income countries. The share of manufacturing, on the other, is far larger than that of the typical low-income countries like India and similar to that of the typical middle-income countries due to high saving and investment in China (World Bank, 1985a). The share of services in output, by contrast, is much smaller than in other developing countries. The low output share of services reflects the limited role of commerce, banking and finance, and miscellaneous business and personal services in the Chinese economy. This also reflects the small share of household consumption in national income and the high degree of enterprise and local self-sufficiency, which reduce the provision of trade, financial and other business services.

In terms of employment, the share of agriculture in China is similar to that of other developing countries but the composition of nonagricultural employment is rather different (World Bank, 1985a). Because of the low share of labour-intensive consumer goods within the manufacturing sector, the employment share of this sector is significantly lower than in the low-income countries but less than its share in output. As expected, the share of services in employment is lower than in other developing countries.

China as a low income country has formed an unusual pattern of production. Further growth is unlikely to be sustained without a balanced allocation of resources among the sectors. In particular, favouring industry at the expense of other sectors does not seem to generate rapid growth. Countries that have stimulated agricultural production and incomes at early stages of development have generally experienced faster, rather than slower, industrial growth. Infrastructure and service sectors are vital for industrial and agricultural efficiency (Syrquin, 1986). The stagnation of the former sectors will eventually constrain the growth of the latter sectors as well as the whole economy.

TABLE 1

PRODUCTION AND EMPLOYMENT PATTERNS OF CHINA AND OTHER COUNTRIES

	Production Patterns				
	China[b]	India[c]	OLI[d]	LMI[d]	$300[e]
Agriculture	36	35	44	23	35
Services	17	33	40	42	35
Industry	47	32	16	33	30
of which					
Manufacture	24	18			13
Mining	11	2			6
Infrastructure	12	12			11
Total	100	100	100	100	100

	Employment Patterns						
	China[d]	India[b]	USSR[f]	Japan[g]	OLI[h]	LMI[h]	$300[e]
Agriculture	70	71	46	26	73	56	67
Services	10	22	19	36	11[i]	16[i]	12[i]
Industry	20	7	35	38	16[j]	28[j]	21[j]
of which							
Manufacture	13		20	24			
Mining	2	1	2	1			
Infrastructure	5		13	13			
Total	100	100	100	100	100	100	100

NOTES and SOURCES:

[a] All data are from Tables 3.6 and 3.9, WORLD BANK (1985b);

[b] 1981 data;

[c] 1979/1980 data;

[d] 1982 data; "OLI" represents "other low income" countries and "LMI" the "lower middle income" economies;

[e] predicted values in 1980/1981 for the group of countries with GDP per head of $300;

[f] 1959 data;

[g] 1965 data;

[h] 1980 data;

[i] The industrial sector here includes mining, manufacturing, electricity and construction;

[j] Transport and services.

Growth without Efficiency. – The fundamental weakness of China's economy has been inefficient use of labour, capital, energy and raw materials. In other words, the Chinese economy has been growing for a long time without efficiency. Virtually all socialist countries have now learned that central planning of a complex economy will not achieve either allocative efficiency or the full utilization of resources. The objectives of the reforms are to decentralize decision-making, to place more reliance on market mechanisms instead of administrative controls, and hence to achieve high efficiency.

Research on the sources of growth has shown that output growth is rarely entirely accounted for by the increased inputs. Efficiency improvement is generally a significant contributor to output growth, especially in most rapidly developing economies. The traditional measurement of efficiency is total factor productivity which is defined as the difference between the rates of growth of output and of the weighted average of inputs. Table 2 presents research findings from various sources. According to this table, the developed economies are characterized by little growth of labour inputs (1.1 percent) and moderate growth of total factor inputs (2.7 percent), while the developing economies have high growth rates of both labour inputs (3.3 percent) and total factor inputs (4.3 percent). However, according to the same table, the developed economies show a relatively large contribution of TFP to aggregate growth (49 percent) and the developing economies a relatively small contribution of TFP to aggregate growth (31 percent). Finally, we observe in Table 2 that the centrally planned economies are in most respects closer to the developing economies than to the developed ones. The developing and centrally planned economies rely more heavily on expanding factor inputs than on increasing efficiency performance to drive growth.

The record of efficiency improvement in China has been a poor one. Calculations for China suggest that total factor productivity of the industrial sector has been either increasing or decreasing depending on the weights given to labour and capital (see Table 3). The contribution of TFP to aggregate growth is very small over time, in particular for the pre-reform period. It is apparent that growth in China has been achieved mainly through the expansion of material inputs. Although these calculations are crude and suffer from numerous conceptual data problems, which are shared by estimates for other countries, these aggregated TFP indexes are rough indicators of performance.

Furthermore, growth without efficiency in China is also very much in evidence in terms of material use. Table 4 presents the international comparisons of consumption of energy, steel and freight transport per US dollar of GDP. It is apparent that China's consumption of intermediate materials per

TABLE 2

OUTPUT, INPUT AND TFP GROWTH RATES OF SELECTED COUNTRIES[a]

		Growth Rates					Growth Shares	
Countries	Years	Y[b]	L	K	T-input[c]	TFP	T-input	TFP
Developing Countries								
Argentina	1950-60	3.30	1.10	2.65	2.25	1.05	68.2	31.8
	1960-74	4.10	2.20	3.80	3.30	0.70	82.9	17.1
Greece	1951-65	6.90	2.80	7.10	4.52	2.18	65.5	34.5
Hong Kong	1955-60	8.25	6.63	4.68	5.85	2.40	70.9	29.1
	1960-70	9.10	2.97	7.60	4.82	4.28	53.0	47.0
India	1960-79	6.24	1.65	4.77	6.42	−.18	102.9	−2.9
Mexico	1950-60	5.65	2.65	5.20	4.05	1.60	71.7	28.3
Philippines	1947-65	5.75			3.25	2.50	56.5	43.5
Spain	1959-65	11.20	4.50	8.70	6.18	5.02	55.2	44.8
Taiwan	1955-60	5.24	1.75	2.68	2.12	3.12	40.5	59.5
Average[d]		6.30	3.30	5.50	4.30	2.00	69.0	31.0
Developed Countries								
Canada	1947-60	5.20	1.10	6.80	1.70	3.50	67.6	32.4
	1960-73	5.10	2.00	4.90	3.30	1.80	64.7	35.3
France	1950-60	4.90	0.30	4.70	2.00	2.90	40.4	59.5
	1960-73	5.90	0.40	6.30	2.90	3.00	49.2	50.8
Japan	1960-73	10.90	2.70	11.50	6.40	4.50	58.7	41.3
Sweden	1949-59	3.40	0.50	2.00	0.90	2.88	26.5	73.5
UK	1949-59	2.50	0.60	3.10	1.30	1.20	52.0	48.0
	1960-73	3.80	0.00	4.60	1.70	2.10	44.7	55.3
US	1947-60	3.70	1.40	4.00	2.30	1.40	69.8	30.2
	1960-73	4.30	2.20	4.00	3.00	1.30	51.0	49.0
Average[d]		5.40	1.10	5.20	2.70	2.70	51.0	49.0
Centrally Planned Economies								
Hungary	1953-65	6.50	3.00	7.30	4.72	1.78	72.6	27.4
Poland	1961-65	6.60	3.00	6.50	4.40	2.20	66.7	33.3
USSR	1950-62	6.30			4.48	1.82	71.7	28.9
Yugoslavia	1953-63	11.80	6.70	7.50	7.02	4.78	59.5	40.5
Average[d]		8.20	4.50	8.00	5.70	2.50	65.0	35.0

NOTES and SOURCES:

[a] For the sources of data, refer to CHENERY (1986);

[b] Y is value-added;

[c] T-input refers to total factor input;

[d] The average is not the mean of the listed countries but of all countries in the group.

TABLE 3

OUTPUT, INPUT AND TFP GROWTH RATES IN CHINA

Years	Growth Rates					Contributions	
	Y	L	K	T-input	TFP	T-input	TFP
1952-57	21.1			13.7	7.4	64.9	35.1[a]
1953-57	8.9	2.8	21.7	10.4	−1.5	116.9	−16.9[b]
	16.7	6.1	16.4	11.6	5.1	69.5	30.5[c]
	6.6			2.5	4.1	38.0	62.0[d]
1957-78	8.8	6.8	9.9	8.4	0.4	95.5	4.5[c]
1965-78	9.1			8.3	0.8	91.2	8.8[a]
1965-76	5.1			4.5	0.6	88.2	11.8[d]
1971-75	5.5	2.1	9.3	5.0	0.5	90.9	9.1[b]
1976-85	8.8			5.0	3.8	56.9	43.1[d]
1978-85	8.6	2.5	4.8	3.8	4.8	44.2	55.8[c]
1980-88	8.5	0.3	1.5	6.1	2.4	71.7	28.3[e]
1981-84	8.7	3.2	8.3	5.2	3.5	59.8	40.2[b]

NOTES and SOURCES:
Output (Y), labour (L), capital (K), total factor input (T-input) and total factor productivity (TFP) could have different definitions and measures as explained in the original references from which each row of data is drawn in this table. Technical notes and detailed explanations can be found in these references. They are: a) TIDRICK (1986); b) DERNBERGER and ECKAUS (1988); c) CHEN et al. (1988b); d) PERKINS (1988); and e) JEFFERSON, RAWSKI and ZHENG (1992).

US dollar of GDP appears high by international standards. China's steel consumption of 127.30 metric tons per million US dollars of GDP in 1981 was, for example, about 30 percent higher than India's, about 10 percent higher than South Korea's and twice as high as Japan's. Consumption of energy of 2.90 kilograms of coal equivalent per US dollar of GDP in 1980 was considerably higher than India's 1.77, more than twice as much as South Korea's 1.12, and almost six times as much as Japan's 0.51, according to Table 4. In physical terms, China's energy of 9.10 kilocalorie per ton of crude steel was significantly lower than India's 11.0 but higher than those of the other countries. These high levels of material consumption are partly a reflection of growth without efficiency.

In summary, according to empirical studies, China's economic performance has been extremely disappointing over the last decades, in particular in the pre-reform period. Although Chinese industrial output growth has

TABLE 4

MATERIAL USE INDICATORS OF SELECTED COUNTRIES[a]

	Developing Countries				Developed Countries			
	China	India	S-K[b]	Brazil	W-G[c]	Japan	US	UK
	Consumption per US$ GDP							
Energy[d]	2.90	1.77	1.12	0.88	0.49	0.51	1.05	0.57
Steel[e]	127.3	98.4	113.8	63	43.70	63.00	44.80	30.00
Freight[f]	3.10	1.67	0.47	0.41	n.a.	0.41	1.80	n.a.
	Consumption per US$ Industrial Output[g]							
Energy[d]	1.06	0.99	0.48	0.32	0.26	0.30	0.47	0.23
Steel[e]	353	379.4	291	168	95	146	132	91
Freight[f]	6.74	6.43	1.22	4.12	n.a.	1.00	5.32	n.a.
	Energy Consumption Per Unit Output of Steel and Transport							
Steel[h]	9.10	11.0	n.a.	5.7	5.2	4.5	6.2	6.4
T-transport[i]	113	n.a.	n.a.	n.a.	n.a.	n.a.	35	n.a.

NOTES and SOURCES:
[a] Data are draw from WORLD BANK (1985b);
[b] S-k = South Korea;
[c] W-G = West Germany;
[d] Kilograms of coal equivalent per US dollar of GDP or output, in 1980;
[e] Tons of crude steel per US dollar of GDP or output, in 1981;
[f] Ton-kilometers per US dollar of GDP or output, 1980-1981;
[g] Net output of the broad industrial sector;
[h] Kilocalorie per ton of crude steel, 1980;
[i] 1000 kilocalorie per 100 actual payload ton-kilometer, 1980.

been high, this growth has been achieved only through an equal or faster rate of growth of inputs. This has to change if China's industrial output growth is to be maintained. Without more efficient use of capital, energy and other materials, it is unlikely that China could achieve the high rate of growth needed to meet the target of national economic development.

4. *Economic Reform in the Industrial Sector*

Background of the Reforms. – In the pre-reform Chinese economic model, a pervasive state regulates industry and agriculture by means of centralized directive plans, enforced by a network of political and administrative agencies. The role of markets is limited. Experience over the last four decades in China suggests that whereas directive planning can play a positive role in the initial stages of industrialization in certain circumstances, this potential for success is highly contingent, subject to severe limitations, and purchased at considerable cost (White, 1984). In general, economic growth in one sector, say heavy industry, has been achieved at the cost of other sectors (e.g. light industry, commerce and services). As the economy grows more complicated and the sources of extensive growth dwindle, the problems with central planning become increasingly multiplied. Furthermore, as the country opens its door to the world, international competition exerts pressures for more flexible economic management and a more dynamic structure. These pressures combined with the success of reforms in other centrally planned economies have forced a reconsideration of the role of markets in the Chinese socialist economy, i.e. the economic reform.

Economic reform in China as in other socialist countries started with the debate between the competitive and complementary views of the relations between plan and market (Liu and Zhao, 1982; and White, 1988). There was no blueprint to serve as a guide; and macroeconomic stability could follow when the system of planning was being dismantled. As a result, the reforms have been implemented on the basis of trial-and-error. The fact that stabilization and market reforms are both needed more or less at the same time led to great uncertainty in reform policies, with much experimentation and modification to cope with unforeseen problems. As some economists put it, there may have been reform cycles over time, however, each reform cycle has been a progressive development of economic and administrative decision-making authority (World Bank, 1990a). This decentralization has certainly had a significant impact on the system's flexibility and on its capacity to respond to economic opportunity. In the following sections, we briefly summarize some of the policy changes which constitute the major reform packages over the last decade in China [6].

Multiplicity of Ownership. – Before the economic reforms, China's economy

[6] For comprehensive surveys on reforms in China, see more detailed discussions in REYNOLDS (1988), TIDRICK and CHEN (1987) and WEI and CHAO (1982).

was dominated basically by two forms of socialist ownership: ownership by the whole people as in all state enterprises and collective ownership by the working people as in the rural people's communes. In late 1970s and early 1980s, it was well recognised that a system totally reliant on state and collective ownership created grave problems for economic activities (Woodward, 1985). Under this system, all economic units of society are operating with low efficiency, supplies of daily necessities fell behind demand, commodity circulation slowed down, more and more enterprises ran in the red and unemployment rose, to cite a few. However, it is argued that there are many advantages for the development of the non-state sector, in particular for the development of the rural township, village and private enterprises, i.e. TVPs. The following advantages of developing rural TVPs, for example, are reported: (1) efficient resource use: the rural TVPs have the ability to utilize dispersed deposits of raw material resources; (2) capital saving: they lower average capital-output ratios and shorten the gestation periods; (3) complement the modern sector: the rural TVPs have the ability to undertake repairing maintenance, processing activities, and freeing large-scale capacity for jobs which the modern sector alone would do; (4) contribution to urbanisation: they reduce the costs of urbanisation and social overhead capital in general and finally, (5) entrepreneurship-creation: the rural TVPs are believed to have the capacity to create industrial consciousness among the peasantry (Y. Wu, 1990; and Riskin, 1971).

Due to the policy shift in favour of multiple ownership, individual enterprises have been encouraged and family enterprises have mushroomed. The GVO share of the state sector among the industrial total, for instance, decreased from 78.47 percent in 1979 to 64.86 percent in 1985 and 52.94 percent in 1991, a loss about ten percentage points every five years according to Table 5. By contrast, the other sectors, i.e. the collective, individual and other, gain about 10 percentage points in terms of GVO shares over the same period of time. In particular, the GVO share of the individual and other sectors in Table 5, usually classified as the "private sector" or "non-state sector" in the Chinese system, rose from zero to a significant figure within ten years.

It is apparent that the state and collective sectors as a whole, usually classified as the "public sector" in the Chinese system, still dominate the Chinese economy. But, the so-called "private sector" had been increasing dramatically in the 1980s. Its GVO share increased from zero in 1979 to about 11 percent in 1991. In fact, a considerable number of private enterprises are registered as collectives (Guo et al., 1992; and Young, 1991), therefore the share of private firms is actually far larger than the recorded

TABLE 5
STRUCTURE OF CHINESE INDUSTRY BY OWNERSHIP, 1953-1991

	State	Collective	Individual	Other	Total
1953	43.04	3.87	19.26	33.83	100
1957	53.77	19.03	0.83	26.37	100
1958	89.17	10.83			100
1965	90.07	9.93			100
1975	81.09	18.91			100
1979	78.47	21.53			100
1980	75.96	23.54	0.02	0.48	100
1985	64.86	32.08	1.85	1.21	100
1990	54.60	35.62	5.39	4.38	100
1991	52.94	35.70	5.70	5.66	100

NOTES and SOURCES:
Data are the shares of gross value of output (GVO) from SSB (1992, Table 10.6, p. 408); "Other" includes joint ventures by state and collective, state and individuals, collective and individuals, China and foreigners; and enterprises owned by overseas Chinese and foreigners (SSB, 1991, p. 463).

value. The presence of private enterprises in the economy has contributed greatly to the economic growth and industrial development in China. The market-oriented behaviour of the "non-state sector" brings competition and hence improves the overall efficiency in the economy.

Profit Retention Scheme. – The profit retention scheme aims at making enterprises more responsible and reduce waste. It was initiated on the basis of early small-scale experiments, notably in Sichuan province. Originally, the experiments involved only a small group of enterprises but their successes led to the scope of the experiments being expanded rapidly. Due to its scope of application, this policy was finally ratified in mid 1979 by the State Council which issued the "Regulations on the Retention of a Portion of Profits by the State Enterprises" (Field, 1984).

Under this policy, the enterprises were allowed to retain a fixed part of their profits. The retained funds can be used freely to some extent by the enterprises. They are, for example, to be used to contribute to self-financing, to be allocated to the factory's social services (housing, canteen, hospitals) and distributed as bonuses. However, for individual firms, profitability depends partly on commodity prices and the historical accident of investments. Retention rates differ widely among enterprises and even for the same

enterprises over time. Enterprises and their employees became concerned with their profit. In other words, the possibility of retaining profits has considerably increased the profit-oriented behaviour of the firms. As a result, efficiency performance should improve over time due to the greater incentives for the firms to maximize profit.

Credit and Investment. – Chinese reformers recognised early that capital charges are a precondition for the financial autonomy of enterprises. Before the reforms, working capital and investment funds were supplied to state industrial enterprises as interest-free budgetary allocations. Capital was thus costless to the enterprises. Under the new system, the bulk of capital advances would be in the form of bank loans, subject to repayment and carrying a cost in the form of interest. At the same time, the government stopped syphoning off enterprise revenues into state coffers and, instead, introduced a scheme that substituted tax payments for profit remittances.

These reforms, it was hoped, would raise the efficiency of capital utilization by introducing more caution and cost consciousness into managers' calculations about the acquisition and use of capital. As a result, there has been a movement towards greater commercialisation of capital provision along several fronts (White, 1988). Although many of the sources of investment funds remained bureaucratic and allocations continued to be made on politico-administrative grounds, the role of credit money was expanded, the regulating power of interest rates was increased, sources of investment finance proliferated and investment decisions were decentralized.

Pricing and Marketing. – Alongside the financial and ownership reforms, the relaxation of controls over prices and commodity allocations has constituted a major item in the reform packages. Under the old regime prices were fixed by the authorities using an average cost plus mark-up rule (World Bank, 1990a). They were altered infrequently. As a result, they were distorted and did not reflect opportunity costs of commodities. For example, the washed coal price was only 45 percent of the international market price, crude oil 30 percent, cast pig iron 70 percent, and plain carbon steel 60 percent (Wu and Zhao, 1987). The first break with tradition came in 1979 when a number of pricing policy reforms were introduced to help the structural change. The most important measure was a dramatic increase of 40 percent in agricultural procurement prices which served to stimulate agricultural production and, through higher peasant incomes, increase demand for industrial goods (Chan, 1989; and Chai, 1986).

Furthermore, floating and negotiating prices were introduced. By Au-

gust 1982, floating pricing was virtually being applied to all products but subject to the band within which prices could fluctuate. Later in 1984, this pricing ceiling was abolished and enterprises were allowed to sell their above-plan commodities at the market. By that time, the two-tier price system was beginning to be accepted. In the late 1980s, the two-tier pricing system became firmly established.

The waning of price controls was matched by the reduced incidence of planned direct allocation by the state. It was argued that a system relying on administrative decisions to mobilize and allocate material resources may play a positive role in the early stages of a socialist economy (Tang, 1987). But as the economy becomes more specialized and economic links more complex, this system ceases to work. It fails to create an efficient link between production and sales, and to reflect the real conditions of supply and demand. With the reforms in the late 1970s and early 1980s, self-marketing was introduced on a large scale. Enterprises were allowed to sell part of their products independently at the market, they signed contracts with other enterprises, set up their own shops and advertised their own products. By 1981 factories were directly selling about 20 percent of industrial consumer goods and, more remarkably, up to 100 percent of some types of machinery and other producer goods (Tidrick and Chen, 1987). Evidence shows that changes in marketing have had a large and beneficial impact on enterprise behaviour (Tang, 1987).

Pricing and marketing reforms affected a significant share of industrial output. Data from the National Conference on Material Flows in early 1986 indicated that the number of categories of materials controlled by the state was reduced from 256 to 23 in 1985, and that unified allocation of coal, timber, steel, and cement to enterprises fell to 50, 30.7, 56.9, 19.4 percent, respectively. The internal tendencies and dynamics created by these reforms have had a great impact on the pattern of resource allocation and the behaviour of industrial decision makers. Overall, these changes should bring about high productivity.

In summary, evidence shows that central planning in countries like China is always problematic and inefficient. It is obvious that a major shift is required in the running of the Chinese economy. The active pursuit of economic reforms in the last decades has brought about great changes in the Chinese economy. As a result, overall efficiency performance should improve over time. China is committed to its journey from central planning to a market-oriented, "socialist commodity" economy. The recent events such as land lease and stock market show the firmness and continuity of further economic reforms in China (Pomfret, 1992).

5. *Growth in the Post-Reform Era*

From the discussions in the preceding sections, it is obvious that the industrial sector in China has been growing at the expense of other sectors, in particular, the service sector. Without policy changes, this pattern of growth cannot be sustained in the long run. The economic reforms introduced in the late 1970s and 1980s were to rectify these sorts of distortions in the economy. This section looks at the structural changes in the production pattern in China after a decade of economic reforms. For the sake of simplicity, World Bank research results are used but it is noted again that there are many technical questions in relating these calculations to studies of other countries.

Table 6 presents the GDP shares and growth rates of China during the

TABLE 6

GDP SHARES AND GROWTH RATES[a]

	GDP Shares									
	1965	1981	1982	1983	1985	1986	1987	1988	1989	1990
A	39	35.8	37	37	33	31	31	32	32	27
S	23	17.2	22	18	20	23	20	21	20	31
I	38	47	41	45	47	46	49	46	48	42
M	30	24.5	n.a.	n.a.	37	34	34	33	34	38
Total	100	100	100	100	100	100	100	100	100	100
	GDP Growth rates									
	60/70		70/80		80/85	80/86	80/87	80/88	80/89	80/90
A	1.6		3.2		9.4	7.9	7.4	6.8	6.3	6.1
S	3.2		3.7		7.5	9.4	7.6	11.3	9.3	9.1
I	11.2		8.7		11.1	12.5	13.2	12.4	12.6	12.5
M	n.a.		9.5		12.4	12.6	12.6	11.0	14.5	14.4
Total	5.2		5.8		9.8	10.5	10.4	10.3	9.7	9.5

NOTES and SOURCES:

[a] All data are from the World Development Indicators, WDR (various versions). A, S, I and M represent the agricultural, service, industrial and manufacturing sectors respectively. The industrial sector includes manufacturing,. mining and infrastructure.

period of 1952-1990. According to this table, the GDP share of agriculture over the national total in China has declined over time. The service sector share in GDP has fluctuated over time but has shown a tendency to increase. Finally, the industrial share of GDP has increased from 38 percent in 1965, to 49 percent in 1987 and to 42 percent in 1990. These observations are even clearer in the second part of Table 6 which presents the sectoral growth rates of GDP. We find that the sectors have been growing more evenly in the last decade than in the pre-reform period. In particular, the difference in the growth rates between industry and services has narrowed over time. The growth rate of services in 1988 was even greater than the average growth rate of the economy as a whole. Furthermore, there is evidence, although controversial, which demonstrates that the total factor productivity of Chinese industry has increased since the inception of the reform program (Tidrick, 1986; and Chen et al., 1988a). Total factor productivity growth rates according to the estimates in Table 3 range from 2.4 to 4.8 percent.

However, in international perspective, the structure of production in China is still atypical in spite of the economic reforms over a decade. This is apparent in Table 7 which presents international comparisons. China still has a relatively small service sector in 1990 (31 percent GDP share), compared to other developing countries e.g. India (40 percent) and lower-middle-income economies (50 percent) during the same period of time. In contrast, the Chinese industrial sector (42 percent GDP share in 1990) is extraordinarily large in comparison with India (29 percent in 1990) and lower-middle-income countries (31 percent).

To sum up, the pattern of production in China has become less irrational due to the economic reforms in the 1980s. The empirical findings reported here so far show that economic growth in China over the last decade has been achieved through improvement in efficiency. However, in the context of international comparisons, China still has a long way to go to achieve a balanced and efficient growth pattern. This suggests the scope for further economic reforms in the economy.

6. *Conclusions*

China has developed a modern industrial sector over the last decades in spite of the political interruptions and civil chaos. In particular, in the 1980s, China achieved the highest GDP growth rates in the world. Furthermore, the development of rural industry has been extraordinarily successful

TABLE 7

GDP SHARES AND GROWTH RATES OF SELECTED COUNTRIES, 1990[a]

	China	India	OLI[b]	LMI[c]	MIE[d]	UMI[e]
	GDP Shares					
Agriculture	27	31	30	17	12	9
Services	31	40	38	50	50	51
Industry	42	29	34	31	37	40
Manufacture	38	19	n.a.		n.a.	25
Total	100	100	100	100	100	100
	GDP Growth Rates[f]					
Agriculture	6.1	3.1	2.6	2.5	2.4	2.3
Services	9.1	6.5	4.8	2.5	2.6	2.7
Industry	12.5	6.6	3.7	2.8	2.3	2.0
Manufacture	14.4	7.1	7.2	3.5	3.5	
Total	9.5	5.3	3.9	2.6	2.5	2.4

NOTES and SOURCES:

[a] All data are from WORLD BANK, *World Development Report 1990*, pp. 220-223; all technical notes and definitions from this reference apply here;

[b] OLI = other-low-income countries;

[c] LMI = lower-middle-income countries;

[d] MIE = middle-income-economies;

[e] UMI = upper-middle-income countries;

[f] Average growth rates from 1980 to 1990.

in recent years. Due to its place outside the plan system, the emergence of a strong non-state industrial sector has greatly invigorated an economy in which the state has for a long time manipulated the major economic activities. As a result, the industrial sector in the Chinese countryside is challenging the dominant role of the state industry in the economy.

However, in international perspective, fast growth in China has not been achieved without cost. Empirical observations demonstrate that growth has been achieved only through equal or faster growth of human and material inputs and through an unbalanced allocation of resources among sectors. This pattern of growth has to change if China is to maintain the target of national economic development.

With the economic reform initiated in the late 1970s, efficiency per-

formance in China has improved over time. It is shown that growth in the reform years has been achieved in association with an increase in productivity. However, in the context of international standards, China is still outside of the mainstream pattern of development.

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CRESCITA, EFFICIENZA E RIFORMA NELL'INDUSTRIA CINESE: ESAME CRITICO

Questo articolo esamina alcuni importanti problemi relativi alla crescita, efficienza e riforma dell'industria cinese. La Sezione 2 presenta una breve rassegna dello sviluppo industriale negli scorsi decenni. Viene anche considerata la crescita dell'industria rurale degli ultimi anni. La Sezione 3 esamina i problemi relativi alla crescita ed efficienza industriale nel contesto internazionale. La Sezione 4 riassume alcuni importanti cambiamenti nella politica di riforma e la loro relazione con l'efficienza nel settore industriale. La Sezione 5 elabora i cambiamenti del modello di produzione dall'inizio della riforma e i problemi che rimangono dopo la riforma. La conclusione dell'autore (Sezione 6) è che nonostante la riforma economica iniziata alla fine degli anni '70 abbia migliorato l'efficienza dell'industria, la Cina è ancora al di fuori del normale modello di sviluppo secondo gli standard internazionali.

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ECONOMIC REFORMS AND INEQUALITY IN CHINA

by
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Socialism has many definitions, but one feature all agree on is that it attempts to ensure that the benefits of economic growth are distributed equitably. To the extent that market-oriented reforms are accompanied by increasing inequality they become less compatible with socialism. Hence the survival of China's socialism in future depends on the critical relationship between economic reforms and inequality.

The purpose of this paper is to examine (a) the trends of inequality in China under the reforms and (b) to find out whether or not there is a correlation between the reforms and inequality in that country.

The paper is divided into three sections. The first surveys the literature on the link between economic reforms and inequality. Section II presents a statistical analysis of China's income inequality during the 14 year reform period. Section III explores the sources of its income inequality. The paper concludes with a summary of the findings and some comments on inequality in China in the near future.

Market-oriented Reform and Inequality

Despite its significance for the survival of socialism there had been only a few theoretical investigations into the relationship between reforms and inequality in socialist countries. Among the few theoretical attempts to explain the nature of this relationship we can distinguish three schools of

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thought; namely (1) the classical school, (2) the neo-liberal school, and (3) the barrier approach.

The classical school holds that reforms are likely to result in increasing economic inequality because of the reintroduction of property income and incentive payments as well as the widening of wage differentials.

A useful approach to analyze income inequality is to treat personal income as composed of two parts, namely wage and property income. Hence the variation of personal income depends on the following factors: (1) The relative shares of wage and property income, (2) the wage and property income differentials, and (3) the correlation of the distribution of these two types of income between individuals [1].

By definition property income in a socialist economy is absent or negligible. This is true even if one considers real income or income in kind, since property income in the form of surplus produced by capital assets is siphoned off by the state and redistributed more or less on an egalitarian basis to individuals either in the form of transfer payments or public consumer goods. Hence, the variation of property income in a socialist society, whether nominal or real, is likely to be very limited.

Similarly, it can reasonably be conjectured that the correlation between the distribution of labor and that of property income in a socialist society is likely to be nonexistent. In contrast to capitalist countries the variation of income in a socialist society is further reduced by the relatively small variation of wage income due to the ideological commitment to equality. Hence, one would in general expect the inequality of income to be less in socialist countries than in capitalist ones.

Economic reforms involve the decentralization of property rights and a change in the preference structure of the political leadership. The former allows individuals to own capital assets and to earn property income. Since property income is less equally distributed than wage income reforms are expected to aggravate overall income inequality. The latter implies the willingness of the political leadership to compromise equality for the sake of growth. To maximise growth individual achievement motivation must be stimulated through better rewards, e.g. incentive pay and larger wage differentials. Since the share of wage income in total personal income is larger than property income a greater variation of wage income is seen by the classical school as the major contributing factor towards increased income inequality under economic reforms.

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[1] $\mathrm{Var}(Y) = (\mathrm{Var})\,P + \mathrm{Var}(W) + 2\,\mathrm{Cov}(P, W)$ where Y is personal, P property, and W wage income; var variance and cov co-variance.

The neo-liberal school, represented by Szelenyi and Mancin (1987), Whyte (1986) and Nee (1989) see control rights of property as an equally important variable as monetary income contributing to inequality. They argue that income distribution in socialist countries is unequal because of a high concentration of control rights. The greater equality of monetary income in socialist countries is merely an illusion for real income inequality is hidden in highly centralized economies through the existence of perquisites and other valuable privileges accompanying power.

According to Szelenyi property income in a socialist society is centralized in the state budget and redistributed by the state in the form of income in kind and subsidies. However, state redistributors as a class are 'selfish' and 'favour' their own kind. Hence property income is mainly distributed to the already privileged and/or in power as is evident from the higher non-wage compensation for the 'redistributive' class, such as housing, access to better education and medical facilities as well as subsidies which are only partially reflected in wage income.

Economic reforms of socialist systems inevitably require the decentralization of property rights. This, together with the shift from bureaucratic to market allocation of goods and factors, reduces the power and control rights of the state bureaucrats. Hence, the neo-liberals hold that reforms lead to a more equal distribution of the control and income rights of capital assets, and thereby decrease income inequality.

While the consideration of control rights is important, the neo-liberal approach suffers several major analytical weaknesses. Firstly, it focuses primarily on the distribution of income between two social classes only, namely the state bureaucrats and the immediate producers. Therefore it is essentially a macro-theory of income distribution, but as such it yields little insight into the size distribution of income within these two groups.

Secondly, it is a static approach and does not take into account the effect of individual capital accumulation on property income. When this is permitted the variation of initial income among individuals is likely to lead to a variation of savings and capital accumulation and finally to an increased variation in property holdings and income because of the stochastic distribution of luck (Adelman and Robinson, 1989, p. 972).

Szelenyi and Manchin (1987) later develop a more dynamic model and modify their proposition. This argues that after initial equalizing effects of the market-oriented reforms, the market creates its own inequalities. In the long run these reinforce those generated by the redistributive economy and leads to rising social stratification as a result of the reforms.

While this revision improves their model it still leaves a major weak-

ness in their approach. For in view of the fact that wage income normally accounts for three quarters of all income, the neo-liberal school underestimated the disequalizing effects of the widening wage differential and of the re-introduction of incentive pay.

The barrier approach argues that economic reforms basically entail the dismantling of the market barriers and the shift from highly restricted to perfect markets of both goods and production factors. In a socialist economy there is a large variety of institutional barriers, namely (1) barriers to the movement of goods and factors of production which result from ideological biases against the market; (2) barriers to the flow and use of information which are due to the high degree of centralization of information; and (3) barriers to opportunities which result in a less than optimal match of individuals and positions due to petty requirements, such as membership in the Communist party, a proper family background etc.. The reduction of these barriers can either increase or decrease inequality of personal income depending on the particular parameters of the socio-economic system (Pryor, 1973, pp. 392-6).

Barriers to information and the movement of goods and factors of production keep them from moving to areas where they fetch the highest price and cause wide dispersions of prices for particular goods or factors over the economy. Hence, they result in relatively greater inequality. The neo-classical general equilibrium analysis predicts that a reduction of these barriers reduces the difference in factor prices between regions, industries, firms and individuals, and, hence, decreases the variation of total income. Barrier to opportunities for labor and capital forestall a meritocracy and thereby serve to decrease inequality. Economic reforms lift these barriers and allow labor and capital to pursue their optimal allocation and highest productivity and income, and, hence, are likely to generate wider dispersion of pay and greater income inequality.

In summary the distributive impacts of market-oriented reforms cannot be unambiguously determined in theory. On the one hand, economic inequality may rise with the re-introduction of property income, incentive payment and the reduction of barriers to opportunity for labor and capital to fully realize their highest earning potentials, as well as the deliberate attempt by the government to widen wage differentials. On the other hand, inequality and stratification may decrease with decentralization of property rights and information, and with the reduction of barriers to the movement of goods and factors of production. Hence, the net effect of the reforms on inequality and stratification can only be empirically assessed on a case by case basis.

Trends in China's Income Inequality

Measures of inequality vary considerably for the same population depending on the unit of analysis, the measure of income and the time period covered. Their selection is often limited by the availability of income data. In the context of China, the only reliable time-series data is that of rural and urban household income survey data by the State Statistical Bureau (SSB). Hence in the following discussion the unit of analysis is household income and specifically household income per capita. The concept of income adopted here is that of disposable income adjusted by transfer payments and receipts. The period covered is from 1978 to 1991.

Before we present the result of our statistical analysis the limitations of the official income data should be noted. As a recent survey by a group of Western economists utilizing Western concepts show (Khan et al., forthcoming) the SSB makes no allowance for the rental value of housing, and its coverage of income in kind and subsidies is less than comprehensive. Hence, the average income of urban and rural households in China is systematically underestimated. However, these limitations do not alter our conclusions significantly. For our analysis is based on a consistent set of income data and our primary focus is not the exact magnitude of inequality in China in comparison with other countries, but the time trend during the 14 years of reforms.

Income differentials within a country are primarily determined by income disparity (1) among rural households, (2) among urban households, and (3) between urban and rural households, e.g. the urban-rural income gap. With respect to the first, namely rural inequality, the Gini coefficient calculated by SSB reveals that it has risen significantly during the first phase of the reforms from 1978 to 1984 (see Table 1) and that the upward trend has continued unabated in the second phase as well.

With respect to urban income differentials the Gini coefficient, estimated from the SSB urban household income and expenditure survey data, indicates a comparatively smaller dispersion of income than in rural areas. Moreover, it declined from 1977 onward, with the Gini coefficient falling from 0.186 in 1977 to 0.168 in 1984, whereas rural household income dispersion increased. However, the trend of narrowing urban income dispersion reversed in 1983 and the trend of rising urban income inequality since then is unmistakable.

In the first period of reforms the trend in urban-rural income disparity paralleled that of urban income differential. For the urban-rural income gap

narrowed from 2.36 to 1 in 1977 to 1.71 to 1 in 1984. Since 1985, however, it widened again.

So far we have referred to the urban-rural income gap of an essentially monetary nature. However, the urban-rural real income gap, which includes income in kind, subsidies etc., may not correspond to the nominal one due to the above mentioned underestimation of income in kind and subsidies by the SSB survey data (see also Lardy, 1984). Provision of the income in kind in China heavily favors the urban population. Khan and colleagues, for example, show that urban households received 39% of their disposable income in the form of subsidies, whereas rural huseholds were in fact paying 2 percent of their personal income in the form of net taxes. Moreover, these taxes include only visible ones. If invisible ones, resulting from the low purchase prices for agricultural products paid by the government purchasing agency, are included, the rate of farm taxation is likely to be much higher. Thus, according to the estimate of Khan et al. the real income gap between urban and rural household in 1988 was at least 2.42 to 1 instead of 2.05 to 1 (Khan et al. forthcoming).

Another reason for the divergence between the real and nominal urban-rural income gap lies in the different rates of inflation between these two sectors. The trend of urban-rural real income differential can be inferred from that of urban-rural real consumption disparity [2]. According to Table 1 the latter roughly corresponds to the trend of the urban-rural nominal income gap. For the urban-rural real consumption gap narrowed from 2.9 to 1 in 1977 to 2.1 to 1 in 1985. Since 1985, however, the growth of the rural real consumption standard has slowed, whereas that of urban households accelerated. As a result the urban-rural real consumption gap has widened again.

Overall income disparity also depends on the percentage share of the urban population or, more accurately, on the share of the non-agricultural population in the total population. Given an urban-rural income gap, migration of the population from the low-income countryside to high-income urban areas will increase the overall dispersion of income until the time that half the population lives in urban areas. Beyond that further rural-urban migration will decrease overall income disparity (Perkins, 1988, p. 639). As the data in Table 1 show, the share of the 'real' urban population, namely the non-agricultural population, increased during the first phase of

[2] China's official per capita consumption data cover both private and public consumption and are therefore more comprehensive in coverage of income in kind than the household income survey data.

TABLE 1

STRUCTURE OF INCOME INEQUALITY, 1977-1991

Year	Gini ratios			urban-rural differential		share of urban population in %
	rural	cities	cities & towns	nominal income	real consumption	
	(1)	(2)	(3)	(4)	(5)	(6)
1977	—	0.186	—	236	—	—
1978	0.212	—	—	—	285	17.9
1979	—	—	—	—	277	18.2
1980	0.234	—	—	—	271	18.9
1981	0.239	0.161	—	205	272	18.2
1982	0.232	0.121	—	183	251	18.6
1983	0.246	0.158	—	170	235	18.8
1984	0.258	0.168	—	171	223	19.3
1985	0.264	—	0.158	172	211	20.5
1986	—	—	0.158	195	222	20.7
1987	—	—	0.158	198	233	20.5
1988	—	—	0.169	205	235	20.7
1989	—	—	0.178	210	231	21.1
1990	0.294	—	0.180	202	242	21.4
1991	0.307	—	0.175	218	—	—

NOTES AND SOURCES:

1. SSB (1987, pp. 4-7) and *ZGNYNJ* (1992, p. 23).
2. Estimate from SSB's urban household income and expenditure survey data given in XIUSHENG (1987, p. 75).
3. Estimate from SSB's survey data in *ZGTJNJ* (1986, p. 579; 1987, p. 694; 1988, p. 809; 1989, p. 729; 1990, p. 297; 1991, p. 277 and 1992, p. 283).

4 & 5. As a percentage of income and consumption in the urban household, see SSB (1984, pp.167 & 169), *ZGTJNJ* (1992, p. 282) and XIUSHENG (1987, p. 60).

5. CHAI (1992b, p. 739).
6. Share of non-agricultural population, CHAI (1992b, p. 740).

the reforms but it did so at a slow pace. Since 1985, however, its rate of increase has accelerated significantly.

Piecing together the evidence, the overall income disparity appears to have remained relatively stable or even to have declined slightly in the first phase of the reforms due to the combination of a) the decline in the urban-rural income gap, b) the decline in urban income inequality, and c) the relatively stable share of the real urban population. But from 1985 on, with a widening urban-rural income gap, an increase in income inequality

within both the urban and the rural sectors as well as a rise in the share of the urban population, the overall income disparity has been on the rise again.

Sources of Income Inequality

Per capita household income, y is defined as income currently earned, Y net of transfer payments, tr, divided by the number of household members, n. Hence, $y = (Y + tr)/n$. Since income earned can be divided into wage income, W, which is related to employment and non-wage income, P, which is property or other type income unrelated to employment, per capita household income can be defined as $Y = (W + P + tr)/n$. This means that per capita household income differential or its variance depends largely on (1) the variance of per capita wage, property and transfer income among households; (2) the relative share of wage, property income and transfer payment in total household income, and (3) the correlation among households of these three types of per capita income.

Urban Income Inequality

Wage is the single largest component of urban household income. In 1981 it accounted for more than 94 per cent of urban household disposable income. And even though its share has declined since then it still accounted for nearly three quarters of it in 1991. Hence most of the dispersion of urban household income can be attributed to the variation of their wage income.

The variation of per capita wage income among urban households largely depends on the variation of their rate of employment and average wage and the correlation of these two factors among the urban households.

The rate of employment in a household is the ratio between the number of employed to the number of household members which basically depends on demographic factors, especially on the number of children and their ages. Every child reduces the rate of employment in the family as it increases the number of dependents and reduces the mother's ability to be employed. This ratio also depends on the employment opportunities for housewifes and care facilities for under-working-age children.

In the pre-reform period the variation in the rate of employment among urban households was significantly larger than that of their average

TABLE 2

URBAN HOUSEHOLDS: RATE OF EMPLOYMENT AND AVERAGE INCOME DIFFERENTIALS

	Rate of employment			Average income [1]		
	cities [2]	cities & towns [2]	urban vs rural [3]	cities [2]	cities & towns [3]	urban vs rural [3]
1981	289	—	122	134	—	160
1982	287	—	123	132	—	150
1983	245	—	114	151	—	152
1984	240	—	109	158	—	156
1985	233	199	100	243	159	189
1986	—	194	97	—	167	205
1987	—	190	95	—	166	209
1988	—	186	93	—	180	219
1989	—	181	93	—	193	225
1990	—	176	93	—	195	217
1991	—	165	95	—	193	229

NOTES:
1. Income per person employed.
2. Ratio between highest and lowest income group in per cent.
3. Ratio between urban and rural household in per cent.

SOURCES:
SSB (1988b, pp. 15, 27, 38, 51, 64, 77-8); *ZGTJNJ* (1986, p. 582; 1987, pp. 691, 694 and 697; 1988, p. 809; 1989, p. 727; 1990, p. 297; 1991, p. 277 and 1992 pp. 282-3 and 306).

wages. It explained two thirds of the per capita income differential between urban households (Xiusheng, 1987, p. 68). Column 1 of Table 2 shows that in the first reform period the rate-of-employment differential between the highest and lowest income group declined. Thus apart from the changing demographic structure the reforms appear to have favoured the lower income group by opening more employment opportunities for them. Since during this period the average wage differential has not declined but increased (see Table 3) the declining rate of employment differential was the major cause of the levelling of the urban income differential in this period.

In the second phase of the reforms since the trend of the declining rate of employment differential among urban households continued (Table 2, column 2) the rising urban income inequality must be due to the increase in average wage differential among urban households. This is confirmed by Table 3 which gives a detailed breakdown of urban household income by

TABLE 3

CITY HOUSEHOLDS: WAGE AND NON-WAGE INCOME DIFFERENTIALS [1]

	Wage [2]			Non-wage [2]	
	Average wage	Basic pay	Incentive pay	Transfer payment I [3]	Transfer pagment II [3]
1981	127	124	142	255	—
1982	127	124	142	228	—
1983	138	124	197	325	—
1984	150	129	226	618	—
1985	157	138	210	322	—
1987	157	132	225	353	—
1988	171	133	263	400	322

NOTES:
1. Ratio between highest and lowest income group in per cent. Figures for 1985-88 are not comparable with those of previous years because of the change in the number of income groups.
2. Average per person employed.
3. For an explanation see text.

SOURCES: SSB (1988b, p. 28, 39, 52, 65 & 143; 1988a, p. 27; 1989, p. 24).

income category. While the data are not complete (data for 1986 and 1989-91 are not available) it shows that between 1981 and 1984 the average wage gap between the richest and the poorest urban households increased slightly. However, the gap was still lower than that of the rate of employment for urban households. Hence it has not been able to counterbalance the income levelling effects of the narrowing rate of employment differential. However, since 1985 the wage gap between the urban richest and the poorest continued to rise and gradually caught up with the rate of employment gap among urban households. Indeed, it became the major source of increasing urban household income disparity during this period.

Since average wage consists of standard pay and incentive pay, the average wage differential depends largely on the relative share of these two types of wages and their relative dispersion. Under the reforms the share of incentive pay soared and reached almost half of total wage pay by the end of 1990. Consequently, as evident from Table 3, the basic pay differential has narrowed and become relatively stable during the first phase of the reforms. It even declined slightly after the wage reform of 1985. The incentive pay differential, however, was much wider and soaring during both phases of

the reforms. Hence the differences in incentive pay was a major source of average wage differential among urban households.

Property or non-wage income is defined here to include both income from individual enterprises and property income per se, i.e. any interest earned from bank accounts, plus share dividends etc. Property income was negligible during the first period of the reforms. Since 1985 its share in total urban disposable income has increased from 2 to about 3 per cent in 1991 (*ZGTJNJ*, 1992, p. 282) but it is not yet an important source of urban income inequality.

Transfer payments in China consist of two types. Type I is provided by enterprises and is 'known as other incomes from household employment units'. Type II is provided by the state in the form of price subsidies, child allowances, pensions and other welfare benefits. Social services (social benefit in kind) are not included in disposable income. Both types of transfer payments constitute an important element of urban household disposable income. During 1975-91 its share rose from 16 to 25 per cent (*ibid*, p. 282).

The distribution of type I transfer payments between urban households was rather unequal as it largely depends on the financial situation of enterprises which employ the main breadearner of the household. This is confirmed in Table 3 which shows that the gap of transfer payment of type I per capita between the richest and the poorest urban households was significantly larger than their average wage gap. There is also a pronounced trend towards rising disparity in transfer payments distributed by enterprises. Hence it can be reasonably concluded that another major source of rising urban income inequality during the second phase of the reforms was the unequal distribution of transfer payments by enterprises. Some of these were in fact disguised wage payments made in an attempt to avoid payment of the bonus and wage adjustment tax.

In the attempt by the government to improve the material situation of low-income groups and families with children as well as pensioners, the share of type II transfer payments rose rapidly in recent years. In 1985 it made up almost 10 per cent of urban household disposable income and by 1991 it reached 17.8 per cent (*ibid*, p. 282).

Data on the distribution of type II transfer payments by income groups are available only for 1988. These show that the gap between the richest and poorest urban households for this type of transfer payments was about 3.22 to 1 in 1988, which was much higher than that of the average wage gap (1.71 to 1). Hence the effects of this type of transfer payments are more disequalizing than the effects of wages. However, its gap was smaller than that of all other sources of income (SSB, 1988a, pp. 2-3). Hence, in contrast

to type I transfer payments the latter have a narrowing effect on per capita urban household income differential, a finding which is also confirmed by Khan et al. (forthcoming).

Rural Income Inequality

Rural household net income is derived from two sources: agricultural and non-agricultural. Despite the rise of township and village enterprises (TVEs) and other non-agricultural activities of rural households, earnings from agricultural activities still accounted for 72 per cent of rural household income in 1991 (*ZGTJNJ*, 1992, p. 307). Hence, most of the variation of rural household per capita net income can be explained by the variation of earning from agricultural activities. Unlike urban households, a significant proportion of rural household earning from agricultural production is implicit property income, P, or rent on land, the height of which depends on the land-man ratio (Id/n) and the average rent received, r, or $P/n = Id/n^*r$. Since the land-man ratio depends largely on the availability of cultivated areas in the region and average rent depends mainly on the quality and location of these lands, the level of individual rural household income from agricultural activities depends very much on spatial factors.

Earnings from non-agricultural activities accounted for about 25 per cent of the total net income of rural households in 1991. Its largest single source of earnings from non-agricultural activities was wage income which made up 9 per cent in 1991. Since wage income was derived mainly from employment in rural TVEs, rural household wage income differential depends largely on the degree of rural industrialization of the regions.

China is a country of vast differences between provinces and regions in terms of agricultural development and rural industrialization. As a result, rural per capita income varies a great deal between provinces. For example, per capita income of Shanghai peasants in 1985 was more than three times that of those in the poorest province, Gansu (Table 4). By 1990, the income gap between the two had risen to a ratio of more than 4 to 1. The rising trend of the inter-provincial rural income inequality is also evident from the estimated population weighted coefficient of variation which rose from 0.7389 in 1985 to 0.75563 in 1990.

There are several reasons why regional rural income disparity has increased under the reforms since 1978. One of the reasons is related to the distribution of property or implicit rental income. Prior to the reforms the government siphoned part of the implicit rental income off in the form of

TABLE 4

REGIONAL DISPARITIES IN PER CAPITA NET INCOME OF CHINESE PEASANTS, 1985 AND 1990 (IN YUAN)

Provinces/ Municipalities	Agricultural Population (1986)		Per Capita Net Income	
	in million	as %	1985	1990
Nation Average	848.2	100.0	398	630
East:				
Beijing	3.9	0.5	775	1261
Tianjin	3.7	0.4	565	1069
Shanghai	4.3	0.5	806	1665
Liaoning	22.2	2.6	468	776
Shandong	68.0	8.0	408	645
Jiangsu	52.2	6.0	493	884
Zhejiang	34.1	4.0	609	1045
Fujian	22.9	2.7	397	765
Guangdong	50.0	5.9	495	952
Hebei	48.4	5.7	385	592
Central:				
Heilongjian	19.7	2.3	398	671
Jilin	14.6	1.7	414	717
Henan	68.9	8.1	329	482
Shanxi	21.0	2.5	358	560
Anhui	44.6	5.3	397	517
Hubei	39.1	4.6	421	602
Hunan	48.9	5.8	395	546
Jiangxi	28.7	3.4	377	580
Sichuan	88.3	10.4	315	505
Shaanxi	25.0	3.0	295	460
West:				
Guangxi	34.6	4.1	303	500
Ningxia	3.3	0.4	321	534
Xizang	1.8	0.2	353	437
Xingjiang	9.3	1.1	394	623
Neimenggu	14.4	1.7	360	607
Yunan	30.5	3.6	338	490
Guizhou	26.4	3.1	288	435
Gansu	17.5	2.1	255	399
Qinghai	2.9	0.3	343	514
Coefficient of variation, population weighted:	0.7389		0.7556	

SOURCE: CHAI (1992b, p. 738).

low fixed prices for agricultural products and redistributed it on an egalitarian basis favoring poorer regions. Another part of the implicit rent was retained by the collective for capital accumulation. Since the government applied pressure on the collectives in the more affluent regions to save a relatively higher proportion of their net output, this had an equalizing effect on regional income distribution. However, with the introduction of the

household responsibility system (HRS), the collapse of the commune system and the increase of agricultural purchase prices, as well as the decentralization of fiscal resources, a large part of the implicit rent was returned to the peasants (Chai, 1985) and is now retained within the region of its origin. Thus the reforms lead to greater regional income disparity.

Another reason is the unequal distributive effect of the state agricultural purchase price policy. Under the two-track agricultural procurement system peasants were obliged to sell a portion of their output to the state at a state-fixed contract price and they were free to sell the remainder on the market at market prices. Since the market price tends to be higher than the contract price the two-track system caused the effective price received by peasants to vary with the size of their output. Therefore the average purchase price received by peasants in rich regions, where output is high, is relatively higher than in poor regions, where most of the output is either self-consumed or sold to the state at the low contract price and where only marginal amounts are left for sale at higher market prices.

Yet another disequalizing factor was the government policy of preferential development of the relatively prosperous Eastern seaboard provinces. This area, in contrast to the inner regions, not only received the lion share of state investments but was also declared an open area where foreign trade and investment restrictions were lifted and special incentives were offered to attract overseas investment (Kueh, 1992). The increased inflow of state and foreign investment into this region, though concentrating mainly in cities, have benefited rural industries and the surrounding rural areas by expanding their market (Knight & Song, 1993, p. 202).

Last but not least, the lifting of the barriers to the movement of the factors of production across regions should be expected to have an equalizing effect on regional income distribution as capital inflow into poorer regions and the movement of labor away from them should improve their economic situation. Unfortunately, so far the rate of migration in rural areas remains relatively low. Between 1985 and 1990 only 0.24 per cent of the 1990 rural population aged 5 and above moved from one country to another (Knight & Song, 1993, p. 210). On the other hand, the lifting of barriers to opportunity for regions to pursue their own comparative advantage and fully exploit their own potential either in agricultural or rural industry should allow rich regions to grow faster and hence contribute to increased dispersion of rural income among regions.

Rural-Urban Income Differential

If transfer payments and receipts are disregarded, the urban-rural per capita household income gap is simply the ratio of per capita urban household wage income (number of wage earners, *lu*, times their average wage, *w*, divided by the number of urban household members, *nu*, or *lu/nu*w*) to that of rural household net income (number of rural income earners, *lr*, times their average wage and property income, *Yr*, divided by the number of rural household members, *nr* or *lr/nr*Yr*). This ratio therefore critically depends on (a) the rate-of-employment gap, namely *lu/nu/lr/nr*, and (b) the average earning-gap, *w/yr*, between urban and rural households.

An analysis of the trend of these two determinants of the urban-rural income gap is given in Table 2 (column 3 and 6). It shows that the decreased urban-rural income disparity during the first phase of the reforms (1981-4) was mainly attributable to the narrowing of both the rate-of-employment gap and the average earning gap. The increased employment opportunities available to rural households as a result of the introduction of HRS, the lifting of restrictions on rural households in engaging in non-agricultural activities undoubtedly contributed significantly to the narrowing of the urban-rural rate-of-employment and, hence, of the income gap during this period.

During the second phase of the reforms the rate-of-employment gap continued to narrow. However, its pace slowed down. At the same time, after an initial decline, the average earning gap between the two household groups increased significantly. For while it was merely 1.56 to 1 in 1984 it widened to 2.29 to 1 in 1991. This apparently was the main source of widening urban-rural income gap in the second period of the reforms.

Given the relative rate of employment in urban and rural households, the basic wage in urban households, the urban-rural average earning gap depends critically (1) on the workers' share in firm profits, (2) on the relative prices of agricultural and industrial products or the agricultural terms of trade, and (3) on the input-output relation or productivity in both the agricultural and industrial sector [3]. An improvement in the agricultural

[3] The urban-rural average earning gap is a ratio of average wage (basic, *Ws*, plus incentive pay, *Wb*) of urban income earners, 1*u*, to the average net income of rural earners, 1*r*. If rural earning from non-agricultural activities and any fixed cost of agricultural production are disregarded and if it is further assumed that all agricultural inputs are purchased from the industrial sector, the average net income of rural earners is equal to total sales of agricultural products, $\Sigma Pa\,Qa$ less total purchase of agricultural inputs $\Sigma Pi\,Qi$ divided by

terms of trade and productivity will reduce the urban-rural average earning gap whereas its worsening will increase it.

Table 5 shows that during the first period of the reforms the agricultural purchase price grew much faster than industrial prices. This, coupled with the increase in agricultural productivity under the HRS, was one of the main sources of the narrowing of the urban-rural household average earning gap in the period. In the second period of the reforms the growth of industrial prices caught up with that of agricultural products and overtook it resulting in the fall of agricultural relative prices. This, together with the slowdown of agricultural productivity growth (Chai, 1992a) was one of the factors behind the rising urban-rural average earning gap. Another contributing factor to the rising urban-rural household average earning gap was the rising share of enterprises and workers in profits in the urban sector under the management contract responsibility system introduced in the second phase of the reforms (Chai, 1991).

Summary and Outlook

In contrast to expectations by neo-liberals, the reforms in China over the last 14 years have not decreased but increased inequalities. However, the trends are complex: overall income inequality has remained relatively stable or even declined slightly during the first phase of the reforms 1978-84. But in the second phase from 1985 up to the present the trend towards greater inequality is unmistakable. The initial improvement in income distribution was mainly due to the declining urban income inequality and the narrowing of the urban-rural income gap. The former was due to the reduction of the rate-of-employment gap between the richest and the poorest urban households. The latter in turn was caused by the reduced differentials of both the rate of employment and average earnings between urban and rural households.

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the number of rural earners or $(\Sigma\, Pa\, Qa - \Sigma\, Pi\, Qi)/Lr$. Hence the urban-rural average earning differential is

$$(Ws + Wb)/(\Sigma\, Pa\, Qa - \Sigma\, Pi\, Qi)/1r$$

If it is assumed that all inputs of the firm are purchased from the agricultural sector and if any fixed cost are disregarded, then, because incentive pay of workers is linked to enterprise profit, Wb is equal to $a\,(\Sigma\, Pi\, Qi - \Sigma\, Pa\, Qa)/1u$ where a is the workers' share in the firm's profit. By simplifying and rearranging, the urban-rural average earning gap can be shown to be

$$1/(\Sigma\, Pa\, Qa - \Sigma\, Pi\, Qi)\,[1r\, Ws + a\, 1r/1u\,(\Sigma\, Pi\, Qi - \Sigma\, Pa\, Qa)]$$

TABLE 5

INDEX OF AGRICULTURAL PURCHASE AND INDUSTRIAL RETAIL PRICES, 1978-1990

	Average farm procurement price [1] (1)	Retail price of industrial products (2)	Relative price of agricultural products (1)/(2)
1978	100.0	100.0	100.0
1979	122.2	100.0	122.2
1980	130.8	100.9	129.7
1981	138.6	101.9	136.0
1982	141.6	103.6	136.7
1983	147.8	104.6	141.3
1984	153.7	107.8	142.6
1985	166.9	111.3	150.0
1986	177.6	114.9	154.6
1987	198.9	120.4	165.2
1988	244.7	138.7	176.4
1989	281.4	164.7	170.9
1990	274.1	172.2	159.2
Annual average growth:			
1978-1984	7.4	1.2	6.1
1984-1990	10.1	8.1	1.1

NOTE:

1. All figures refer to state purchase prices only. 1978-84 figures include quota, above quota and negotiated prices, and 1985-90 figures include contract, proportion and negotiated prices.

SOURCE: *ZGTJNJ* (1991, p. 230).

As predicted by the barrier approach, the lifting of the barriers to employment in individual private enterprise activities under the reforms opened up relatively more employment opportunities for the urban poor and, hence, reduced the gap in the rate of employment among urban households. Similarly, the lifting of the restrictions for farmers to engage in non-agricultural activities and in rural-urban migration has improved the rate of employment for peasant households relative to their urban counterparts.

The initial decline in the urban-rural earning gap can in part be attributed to the decentralization of property rights under the HRS and the resulting increase in farm productivity. However, it was also due to the increased state's agricultural purchase price in that period.

The rise of income inequality since 1985 was triggered by an increase in intra-sector inequality in both the urban and rural sectors as well as the

widening urban-rural income gap accompanied by a rising share of the urban in total population. Again, market-oriented reforms played a significant role in increasing inequality during this period. However, state policies reinforced the tendency towards growing inequality rather than ameliorating it.

The rise of urban inequality during this period was mainly due to growing wage differences, especially in incentive pay for urban workers. The differential in incentive pay can in part be attributed to the market-oriented reforms as these created greater differences in reward in order to generate achievement motivation. However, they were also partly caused by state policy especially since the state was reluctant to modify property relations of and to introduce capital charge for state-owned enterprises. Thus workers' pay contained an element of quasi rent and depended largely on enterprise profit. Enterprises with better access to state capital were able to acquire a quasi rent which was then distributed to workers as wages, and hence, led to the growing inter-firm wage differentials.

Another important source of the rising urban income inequality since 1985 was the growing differential in transfer payments funded by enterprises. Their distribution was rather unequal as it depended largely on the financial strength and profitability of the individual enterprise. Since these payments and their structure are a legacy of the past, the inequality in income generated by it can only be attributed to the state policy rather than to the impact of the reforms.

The rising rural income disparity during the second phase of the reforms was largely accounted for by the growing inter-regional rural income differential, most of which can be attributed to the impact of market-oriented reforms. The de-facto privatization of farm land and the collapse of the commune distributive system allowed peasants to appropriate most of the implicit rent on land. Peasants in regions with better land endowments and better access to transport and markets were able to acquire a relatively higher rent than others. The lifting of barriers for regions to fully exploit their own comparative advantage either in agricultural or non-agricultural activities also favored rich regions over poor ones. However, a part of the rising regional disparity in rural income was also due to the government's preferential development policy of the Eastern seaboard.

Similarly, the widening urban-rural income gap during the second phase of the reforms was attributable to a combination of market factors and state policy. The growing urban-rural average earning gap mirrored mainly the growing urban-rural worker productivity gap. However, it was also partly caused by the state policy of depressing state contract purchase prices for agricultural products below the market value in order to extract

surplus for urban-industrial development from rural areas (Kueh, 1993). Finally, the rising share of the urban population in the total population as a result of greater population mobility under the reforms also played an important role in increasing the urban-rural income differential.

In the future the widening of the earning differential is likely to continue and perhaps even to strengthen. For it must be expected that the share of the urban population is likely to keep rising, a factor which alone will contribute to greater overall income inequality. Moreover, the market reforms are expected to continue to generate productivity and hence contribute to greater earning differentials between urban and rural workers. This trend is going to be exacerbated by the state's policy of controlling the agricultural terms of trade which is most likely to continue for the sake of promoting urban industrial development with the help of rural surplus. The growing regional income disparities will also promote greater income inequality. However, this factor is likely to be weakened by the greater regional mobility of labor and capital. Finally, the current urban pay differential is considered too narrow by the government. The Gini coefficient of urban income distribution barely reached 0.2 in recent years, which according to the classification of SSB, is rated as "extremely egalitarian" (Zhang and Shucheng, 1991, p. 53). Hence an enlargement of this differential for the purpose of promoting efficiency and incentive is expected in the future.

However, the prospect of inequality in China does not have to be quite as bleak as described above because the distribution of earnings between recipients is not necessarily identical with that of household income. Theoretically the latter can be made to differ from the former in order to reconcile the conflict between efficiency and equity (Chilosi, 1980).

To reduce the extent of inequality generated by market-induced earning differential the state could, first of all, reform the funding of the welfare system. Since welfare provisions and services are presently enterprise and local collective funded they exacerbate inequalities, with the most prosperous collectives and enterprises able to provide the more and better quality facilities at the least cost to clients. Hence to arrest the rising trend of inequality social services need to be funded by the state and distributed according to need.

Secondly, in order to prevent both enterprises and farms with access to better capital and land from reaping excessive rent income, rental charges on both capital and land should be introduced. Another factor which might alleviate the growing inequality is the lifting of the barriers to movement of production factors across regions. So far this has not had much impact because inter-regional mobility of both labor and capital in China is still

constrained. Hence the development of a fully-fledged capital and labor market should help to ameliorate inequality in China. Finally, as in capitalist societies, a comprehensive progressive income tax could also make a considerable contribution to the narrowing of the household income differential by decreasing their earning differential.

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RIFORME ECONOMICHE E DISUGUAGLIANZA IN CINA

Il problema del se le riforme orientate verso il mercato hanno la probabilità di aumentare o diminuire la disuguaglianza nelle economie socialiste è una questione empirica che non può essere risolta con ragionamenti aprioristici. Da un lato, la disuguaglianza economica può aumentare con la reintroduzione dei redditi patrimoniali e degli incentivi e con la riduzione degli ostacoli al lavoro e al capitale di realizzare il massimo potenziale di guadagno. D'altro lato, la disuguaglianza può diminuire con la decentralizzazione dei diritti di proprietà, dell'informazione e con la riduzione degli ostacoli al movimento dei beni e dei fattori produttivi. L'esperienza cinese mostra che le disuguaglianze economiche non sono aumentate, ma anzi sono leggermente diminuite durante la prima fase delle

riforme. Ma sono aumentate nella seconda fase. Questo articolo esamina le ragioni della disuguaglianza causata dalle riforme in Cina ed espone alcune riflessioni sulle sue prospettive future.

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INTRA-URBAN HOUSING PRICE COINTEGRATION: AN EMPIRICAL APPROACH

by
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1. *Introduction*

In view of the emergence of housing problems in urban areas, higher service standards and balanced urban growth through plans directed towards the demand side of the housing market, are often required. Intra-urban demand reallocation can contribute to greater urban efficiency, higher productivity and incomes as well as higher environmental quality. See for example Basta (1977), Linn (1983) and Dunkerley et al. (1983).

In order to provide the necessary information, the structure of intra-urban housing prices has to be known, since effective price controls or supply reallocation must take into account the effects of the plan on several parts of the urban housing market. An important issue is whether or not intra-urban housing prices are cointegrated and what the characteristics of their interrelationship are.

Rosenthal (1986) in her study for the U.K., used cross-spectral techniques to draw the conclusion that regional housing price changes are indeed highly associated, possibly due to national economic trends. The period of the common cycle was found to be approximately 2 to 4 months. One shortcoming of Rosenthal's (1986) approach is in the level of aggregation she uses – she divided the UK into only two regions – and that cross-spectral techniques do not properly account for the complicated dynamics of the urban housing market, given the sample sizes we often use in applied econometrics.

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The present study tries to rectify the shortcomings of the existing approach by using a Vector Autoregression (VAR) technique as well as cointegration-based methods to test for weak market efficiency. Given that the housing market has received strong attention as a profitable investment, market efficiency tests are particularly important as tools for designing effective price stabilization at the urban level (Dunkerley et al., 1983).

The rest of the paper is organized as follows: Section 2 presents the theoretical VAR models and the fundamental issues behind the cointegration tests. Data is described in Section 3 while the empirical results are presented and discussed in Section 4. The final section concludes the paper.

2. *Model Specifications*

2.1. *Housing Market Efficiency.* – Over the last ten years, many tests of the efficient markets hypothesis (EMH) have been conducted in a variety of financial markets. A market is said to be efficient if market prices fully reflect all the available information (Fama, 1970). The EMH consists of the joint hypotheses that agents form their expectations rationally, and that they know the equilibrium process driving the excess returns (for which risk aversion or risk neutrality is a sufficient condition). See for example Bilson (1981).

In the past, the stock market, international currencies and asset markets have received attention as candidates of efficient markets. See Hakkio (1981), MacDonald and Taylor (1988), Huang (1984), Geweke and Feige (1979) and Cerchi and Havenner (1988).

Urban housing markets are also candidates. The reason is that housing is an important asset with both speculative and risk-free price components, and therefore it is usually a significant part of portfolios of large investors and government agencies. On the other hand, rational expectations and non-risk-loving is all that is required to make excess returns zero and impose market efficiency. Given the potential forecasting ability of large investors, testing for the EMH at the intra-urban level becomes an interesting issue.

The two joint assumptions of the EMH are often imposed in general equilibrium models of rational economic agents – see for example Sargent (1979) and Bossaerts (1988). If a market is efficient, un-coordinated actions lead to a Pareto optimum (Fama, 1976) and therefore governmental intervention should be avoided. To the extent that housing prices are usually administered, tests for market efficiency are sine qua non for any rational policy making at the urban level.

2.2. *The Vector Autoregression Model.* – Andrikopoulos, Prodromidis and Tsionas (1990) introduce the concept of rational expectations in traditional demand models of the intra-urban housing market, following the methodology of construction and estimation of a VAR scheme for housing prices (see Granger and Newbold, 1986, ch. 7).

Let $P(i, t)$ be the housing prices at the urban area i at time period t ($i = 1, \ldots, n$; $t = 1, \ldots, T$). We assume the following linear stochastic process:

$$P(i, t) = \sum_{j=1}^{n} \sum_{k=1}^{R(i,j)} a(i, j, k) P(j, t-k) + U(i, t) \qquad (1)$$

$$(i = 1, 2, \ldots, n)$$

where $R(i, j)$ designates the number of lags of $P(j, .)$ in the i^{th} equation of the VAR and $U(i, t)$ is a matrix-stochastic-process with a finite, positive definite covariance matrix, zero mean vector and zero intertemporal covariance matrices. See for example Sims (1977).

The estimation of (1) is carried out using the Minimum Final Prediction Error (FPE) iterative scheme suggested by Hsiao (1981). See also Judge et al. (1985). The Minimum FPE iteration estimates the optimal number of lags $R(i, j)$ by minimizing:

$$\text{FPE}(i) = S(i)\left[1 + T^{-1} \sum_{j=1}^{n} R(i, j)\right] \qquad (2)$$

$$\text{where } S(i) = \left[T^{-1} \sum_{t=1}^{T} \hat{U}(i, t)\right] \qquad i = 1, \ldots, n \qquad (3)$$

and $\hat{U}(., .)$ is the estimated residual series for the i^{th} equation of the VAR.

This criterion is due to Akaike (1969), while other approaches to the problem of order identification of approximating autoregressive schemes have been proposed by Akaike (1970), Parzen (1976) and Anderson (1963). After the sequential order identification procedure, we treat the estimated version of the VAR as the maintained hypothesis. Since the $R(i, j)$'s are not necessarily equal across equations, the efficient estimator in this case is given by Zellner's (1962) iterative multivariate estimation method, fully equivalent to the maximum likelihood estimator.

2.3. *Cointegration.* – Cointegration is a statistical concept pioneered by Granger (1986), Granger and Weiss (1983) and Engle and Granger

(1987). In general, two non-stationary series are cointegrated if a linear combination of them is stationary. More precisely, assume that $X(t)$ and $Y(t)$ are two stochastic processes, integrated of order k, i.e $I(k)$. If there exists $c \in R$ and the process $U(t) = X(t) - c\,Y(t)$ is $I(m)$ the processes $X(t)$ and $Y(t)$ are said to be cointegrated of order k, m or $C(k, m)$.

Granger (1983) showed that two processes are $C(1, 1)$ if and only if:

$$X(t) - X(t-1) = a\,[X(t-1) - cY(t-1)] + b\,[Y(t) - Y(t-1)] + \\ + g(Y, X) + e(t) \qquad (3)$$

where $g(.,.)$ is a linear function of first differences of the series and $e(t)$ a possibly non-white stochastic process.This is in Hendry's (1964) terms an error-correction representation.

The first cointegration test is based on a two-step approach by Engle and Granger (1987) and Coleman (1990). The first step is to test that housing prices are $I(1)$, i.e. that they follow a random walk. To test the hypothesis the following equation is estimated:

$$P(i, t) = \alpha + \beta P(i, t-1) + \gamma \sum_{j=1}^{L} P(i, t-j) + u(t) \qquad (4)$$

The t-statistic for β is used with critical values from Fuller (1976). The parameter L is selected to reduce the process $u(t)$ to white noise. Given that housing prices are $I(1)$ the second step is to estimate the cointegrating regressions:

$$P(i, t) = \alpha + \sum_{\substack{j \neq i \\ j \in K}} \beta_j P(j, t) + \xi(t) \qquad \forall K \qquad (5)$$

and test whether or not $\xi(t)$ is stationary. K is a subset of the set of all possible combinations of (i, j). This test can be done using the augmented Dickey and Fuller (1979, 1981) statistic. If $\xi(t)$ rejects the hypothesis of $I(1)$, urban housing prices are cointegrated and inconsistent with the EMH. It must be noted that for values of $\# K > 2$ the properties of the test are not established. Therefore, the analysis is restricted only to all possible pairwise cointegrating regressions. See also Hakkio and Rush (1989) for a similar approach.

3. *Data*

The urban housing prices for Attica Department, Greece, will be used

to study market efficiency and housing price interrelationships. The data cover the period 1977-July until 1988-October. Effective housing prices were computed using raw data on the value of new buildings according to issued construction permits and on volume of regular rooms (in dwellings with 1-4 rooms) according to permits issued for new dwellings. The data came from the *Monthly Statistical Bulletin* of the National Statistical Service of Greece (various issues, 1977-1988). Three-month moving averages and logarithmic transformation were used.

Attica Department was divided in two areas: Greater Athens and Rest of Attica. Greater Athens includes four subregions: Athens, Piraeus, East and West Attica. The subdivision for Rest of Attica includes the parts of Piraeus, West and East that do not belong to Greater Athens.

4. *Empirical Results*

4.1. *VAR Estimation and Testing.* – Table 1 presents the optimal number of lags $R(i, j)$ used in the VAR. Table 2 presents the causality tests for price exogeneity. The estimates cannot be interpreted in a structural sense and therefore they will not be reported here. Yet, the large proportion of statistically significant parameter estimates as well as the absence of error autocorrelation (as indicated by the Box-Pierce "portmanteau" Q-statistic) imply that serious misspecification is not present, except possibly in the equation for Piraeus-Rest of Attica.

TABLE 1

VAR ORDER SELECTION

Area	Optimal number of lags in area						
	1	2	3	4	5	6	7
Athens							
1. Athens	5	2	–	–	–	–	–
2. Piraeus	5	5	4	3	–	1	–
3. West	5	1	4	5	2	4	2
4. East	–	–	4	3	–	3	–
Rest of Attica							
5. Piraeus	5	1	–	2	3	1	–
6. West	5	–	–	–	–	3	5
7. East	–	1	–	1	4	2	3

TABLE 2

CAUSALITY TESTS BASED ON VAR MODEL

Area	Chi-square tests and degrees of freedom					
	$H_0(1)$		$H_0(2)$		$H_0(3)$	
Athens						
Athens	11.13	2	49.73	5	–	
Piraeus	93.68	13	39.27	5	4.21	1
West	79.50	20	24.08	3	44.10	9
East	47.38	7	56.60	3	7.02	3
Rest of Attica						
Piraeus	49.68	9	57.2	3	48.16	8
West	56.08	7	33.69	3	54.92	5
East	62.19	11	0.17	1	27.63	5

NOTE: For the definition of the hypotheses see equations (11)-(13) in the text.

The applicability of the R^2 measure of fit (not reported here) is limited in view of the adopted system-wide estimation technique. Generally, half of the data variability seems to be explained by the model – given the reservation mentioned above.

To judge adequately the out-of-sample fit of the model, the appropriate approach is to use the *Kalman filter algorithm* to reestimate the model and evaluate measures of forecasting performance. Table 3 presents the results of model's performance with a forecasting horizon of 1, 5 and 10 time periods. Judging from the values of RMSE's for example, it is evident that the model does fairly well in horizons up to a year despite that monthly data were used. This also indicates that relying solely on R^2's in dynamic econometric models, may sometimes be quite misleading.

Three types of causality tests in Granger's (1969) sense are conducted:
(1) In the i^{th} equation all lags of prices in location j ($i \neq i$) are insignificant, i.e. $P(i, .)$ is exogenous with respect to the price system.
(2) Own lags are zero, i.e. $P(i, .)$ is completely driven by the other housing prices (i is a dependent area).
(3) Lagged prices in Greater Athens (Rest of Attica) do not affect prices in Rest of Attica (Greater Athens).

These tests were carried out using Zellner's (1962) multivariate estimation technique and likelihood ratio X^2 tests were used. Formally the tests can be described as follows:

TABLE 3

FORECAST STATISTICS FOR VECTOR AUTOREGRESSION
Kalman Filtering Estimation

	Mean Error	Mean Absolute Error	RMSE
Equation	STEPS = 1		
1	−.0446	.187	.236
2	.0143	.258	.294
3	−.0144	.227	.248
4	−.0969	.219	.283
5	.0409	.251	.292
6	−.0352	.310	.419
7	−.0781	.239	.307
	STEPS = 5		
1	−.0841	.184	.220
2	.0282	.206	.224
3	.0052	.246	.278
4	−.0896	.239	.266
5	−.0082	.338	.388
6	.0073	.315	.434
7	.2040	.319	.363
	STEPS = 10		
1	−.1059	.106	.106
2	.6208	.621	.621
3	.1743	.174	.174
4	.1227	.123	.123
5	−.1656	.166	.166
6	−.2661	.266	.266
7	.5149	.515	.515

NOTE: RMSE stands for root-mean-squared-error. "Steps" refers to the number of forecasts being undertaken. Estimation period includes observations up to 1987-September.

Let

$$P(i,\ t) = \sum_j A_{ij}(L)\, P(j,\ t) + U(i,\ t) \tag{8}$$

$$i = 1,\ \ldots,\ n;\ t > \max R(i,\ j)$$

where $A_{ij}(L)$ is a polynomial of the lag operator (L) of order $R(i, j)$. Let also

$A_i(L)$ $(i = 2)$ be a vector-valued function such that:

$$A_1(L) = [A_{21}(L) \quad A_{22}(L) \quad \ldots \quad A_{2n}(L)] \tag{9}$$

$$A_2(L) = [A_{11}(L) \quad A_{12}(L) \quad \ldots \quad A_{1n}(L)] \tag{10}$$

Then cases (1), (2) and (3) are equivalent to the hypotheses:

$$H_0(1): A_{ij}(L) = 0, j \neq i, i = 1, \ldots, n \tag{11}$$

$$H_0(2): A_{ii}(L) = 0, i = 1, \ldots, n \tag{12}$$

$$H_0(3): A_i(L) = 0, i = 1, 2 \tag{13}$$

From Table 2 the following conclusions emerge:
First, all prices seem to be interrelated. No price has been found to be Granger-exogenous. Second, only prices for E. Rest of Attica are dependent. Third, for two regions of Greater Athens Piraeus and E. Attica) prices conform to $H_0(3)$, that is Rest of Attica's prices do not influence prices in Piraeus and E. Attica.

Overall, there is a strong pattern of dynamic association as the long lags involved testify (see Table 1). Moreover, the results conform to Rosenthal's (1986) study for the UK.

4.2. *Market Efficiency Tests.* – Table 4 reports the augmented Dickey-Fuller tests for the first-step regressions. Values of L reported here, include $L = 2$, 4 and 7. At lag $L = 7$ the errors have been reduced to white noise. From the values of t-statistics it is apparent that the price series can be

TABLE 4
AUGMENTED FIRST-STEP DICKEY-FULLER COINTEGRATION TESTS

	$L = 2$	$L = 4$	$L = 7$
1	–1.64	–1.33	–1.61
2	–.668	–.803	–.812
3	–.404	–.317	–.483
4	–1.93	–1.95	–2.14
5	–1.34	–1.36	–1.54
6	–1.78	–1.88	–1.72
7	–1.21	–1.24	–1.18

NOTE: At lag $L = 7$ all equation errors are free from autocorrelation as the Q-statistics indicated. At lag $L = 4$ only equation 5 showed a marginally significant Q-statistic. From FULLER (1976) the 5% critical value is approximately 2.50 in absolute value. Regions are (1) Athens, (2) Piraeus, (3) East and (4) West Attica. Rest of Attica includes (5) Piraeus, (6) West and (7) East Attica.

TABLE 5
AUGMENTED SECOND-STEP DICKEY-FULLER COINTEGRATION TESTS

	1	2	3	4	5	6	7
1		−.474	−.288	−.335	−.299	−.428	−.434
2	−.507		−.307	−.328	−.348	−.429	−.496
3	−.251	−.258		−.290	−.238	−.370	−.405
4	−.440	−.421	−.431		−.403	−.585	−.552
5	−.313	−.343	−.265	−.291		−.410	−.363
6	−.445	−.425	−.459	−.478	−.447		−.417
7	−.512	−.572	−.533	−.501	−.449	−.524	

NOTE: From FULLER (1976) the 5% critical value is approximately 2.50 in absolute value. Seven lags were used to augment the Dickey-Fuller test. Regions are: (1) Athens, (2) Piraeus, (3) East and (4) West Attica. Rest of Attica includes (5) Piraeus, (6) West and (7) East Attica. Entry (i, j) reports the regression coefficient of $P(i, t)$ on $P(j, t)$ and a constant term.

reasonably taken to be $I(1)$. At the second-step, we test whether or not the residuals are stationary. The relevant augmented Dickey-Fuller tests for all possible pairwise cointegrating regressions are reported in Table 5.

The low values of t-statistics, indicate that the residuals do follow a random walk and therefore *housing prices are not cointegrated.* This confirms that the urban housing market is efficient. Similar results were obtained when higher orders of combinations were examined. For $k = 6$ the augmented Dickey-Fuller tests ranged from −.212 to −.451. So the hypothesis that the residuals of the cointegrating regression are stationary, is rejected thus conforming compatibility with the EMH.

Conclusion

The purpose of the paper was to test for causal orderings and market efficiency in the urban housing market. From the VAR model one may conclude that strong dynamic correlations exist between the housing price series. The cointegration-based tests showed that the markets are weakly efficient and therefore it is not possible to use past information to forecast future values of urban housing prices.

Besides indicating that causality tests do not suffice to reveal the true dynamic properties of time series, the analysis also suggested that Athens' urban housing markets are efficient and therefore government's intervention

will be of questionable effectiveness, since it will necessarily move the markets away from a Pareto optimum.

An interesting subject for future research is to examine the paradox discovered in this study, namely that cointegration-based tests support the EMH while VAR and causality analysis suggests important dynamic linkages (that can be used effectively to forecast future prices). A possible resolution will most likely be the low power of VAR-FPE tests under the EMH for the sample sizes one most often has to consider.

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COINTEGRAZIONE DEI PREZZI DEGLI ALLOGGI URBANI

L'articolo esamina il problema dell'interazione del prezzo degli alloggi urbani allo scopo di trarre delle conclusioni sulla cointegrazione dei prezzi e sulla debole efficienza del mercato degli alloggi urbani in Grecia. Vengono qui applicati dei test di causalità per verificare l'esogenità delle serie dei prezzi e dei test basati sulla cointegrazione dell'efficienza del mercato. Sono inoltre discusse le implicazioni dei risultati empirici sulla politica urbanistica.

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FOOD SUPPLY AND INFLATION IN NIGERIA: A SIMULTANEOUS EQUATION APPROACH

by
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1. *Introduction*

The literature is replete with studies on the dynamics of inflation in both advanced and developing countries. Most of the theoretical and empirical studies on inflation, however, have dealt either with the relationships between wages and inflationary pressures or with inflation and demand, or with inflation and fiscal deficits [1]. A large number of studies have concentrated on the link between monetary expansion and inflation [2]. Few studies have also dealt with the infuences of such factors as interest rate, exchange rate and tax rate [3]. A small number of studies have equally looked into the joint influence of both the monetary, fiscal and supply side elements such as interest rate as well as exchange rate [4].

However, not much attention has been focussed on the influence of food shortage on inflationary pressure while in recent years most developing countries especially in Africa have been experiencing burgeoning food import bills.

In this paper we developed a small model of the interactions between the main variables in the price formation which we use to test the hypothesis that inadequate food supply is associated with inflation. The model stresses the role of interest rate in the unorganised money market on the behaviour of variables such as food and industrial prices.

The model is estimated by using Nigerian data covering the period

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[1] See e.g. AGHEVLI and KHAN (1978) and ROS and VAZQUEZ (1980).

[2] See e.g. HARBERGER (1963), KHAN (1980), and VOGEL (1974).

[3] See e.g. SUNDARARAJAN (1986).

[4] See DOWNES (1985), and IZE and SALAS (1985).

1960-91. Section 2 gives the basic framework of the model. In Section 3 the empirical results generated from estimating the model are presented. Finally, in Section 4, appear some concluding remarks.

2. *The Model Equation*

In this section we will present the specification of the model.

Food Price. – The rate of change in food prices is assumed to be a function of the rate of change in domestic food production Q_t, the rate of change of food import M_t, rate of change in industrial wages (w), interest rate at the unorganised market r_u, and flow of credit to the agricultural sector.

$$P_{ft} = P_{ft}(Q_t, M_t, r_u, W_t, C_r) \tag{1}$$

Rather than using the interest rate in the organised market, we utilize the cost of credit in the unorganised market. Generally, farmers have little access to formal credit market. It is not clear whether this is because of relatively low returns among the farmer borrowers or because of other factors such as high administrative costs involved in such lending. Whatever the reason, they must rely instead on more expensive informal credit. However, time series data on such interest rate are not available in Nigeria, we therefore proxied it by

$$r_u = \frac{M_{SB}}{M_s^2}$$

where

$$r_u = r_u(r^*, P_o^*, M_{s-1}^2, G, FER_{-1}) \tag{2}$$

M_{SB} is defined as money supply outside the banking system and M_s^2, is the money supply broadly defined ($CC + DD + TD$). The relationship between P_o^* and r_u could be either neutral, negative, or positive since an increase in P_o^* would normally result in a relatively liberal fiscal and monetary policies. An expansionary monetary policy is expected to result in a fall in r_u while a contractionary fiscal policy would result in a rise in r_u. Hence, the impact of an increased P_o^* can be positive, negative, or neutral. We expect the unorganised market rate (r_u) to behave like the conventional interest rate with respect to foreign interest rate r^*, money supply broadly defined lagged one period M_{s-1}^2 and G, government expenditure.

Industrial Wages. – The industrial wages is specified to depend on the rate of change in the cost of living index (L), industrial output YN and inverse of the beginning of the period unemployment rate lagged one period U^{-1}_{-1}.

$$W = W(L, Y_N, U^{-1}_{-1}) \tag{3}$$

The expectation is that L and Y_N will have increasing effect on W. We expect the U^{-1}_{-1} variable to have positive impact on the wage rate.

Industrial Prices. – The industrial price equation is made a function of the rate of change in wages (W_t), rate of change of non oil output production (Y_N), rate of change in the Naira price of imported intermediate inputs (eP_{int}), and the rate of change in the organised and unorganised market rate $\left(1 + \frac{r_u}{100}\right)$

$$P_t = P_t\left(W_t, Y_N, eP_{int}, 1 + \frac{r_u}{100}\right) \tag{4}$$

Realistically, the wholesale price index is a linear combination of its different components with fixed weights. As the wholesale price index is not computed in Nigeria, we assume that it can be approximated by a linear combination of four of its components namely rate of change in food prices, rate of change in agricultural prices, rate of change in prices of industrial goods and rate of change in prices of imported inputs

$$P_w = a_1P_{ft} + a_2P_{ag} + a_3P_{it} + a_4P_{int} \tag{5}$$

The model is closed with an equation which assumed that there is some kind of mark up from wholesale prices to retail prices. And if the mark-up is proportional to the wholesale price, it means that the sum of the parameters must be unity.

$$L_t = L_t(P_w, P_{w-1}, P_{w-2}, P_{w-3}) \tag{6}$$

Equation 6 assumes that the rate of change in the cost of living index – retail price index is a distributed lag of the rate of change in the wholesale price.

3. *Empirical Results*

Empirical results for equations (1) to (6) estimated on the basis of

TABLE 1

FOOD SUPPLY AND INFLATION: THE ESTIMATED RESULTS

$$P_{ft} = \underset{(2.16)}{2.31} - \underset{(-0.86)}{0.36Q_t} + \underset{(2.14)}{0.15M_t} + \underset{(3.15)}{0.69r_u} + \underset{(1.23)}{0.02W_t} + \underset{(2.13)}{0.26C_r}$$

$$D^w = 1.934 \quad R^2 = 0.72 \quad SEE = 0.032$$

$$r_u = \underset{(4.12)}{3.02} - \underset{(-1.06)}{0.08P_g^*} + \underset{(0.49)}{0.16r^*} - \underset{(-2.14)}{2.14M_{s-1}^2} - \underset{(2.63)}{0.09G} - \underset{(2.10)}{2.14FER_{-1}}$$

$$DW = 1.699 \quad R^2 = 0.69 \quad SEE = 0.142$$

$$W = \underset{(2.15)}{1.43} + \underset{(2.76)}{0.67L} + \underset{(0.14)}{0.03U_{-1}^{\frac{1}{2}}} + \underset{(0.12)}{0.02Y_N}$$

$$DW = 2.102 \quad R^2 = 0.77 \quad SEE = 0.013$$

$$P_t = \underset{(2.74)}{3.17} - \underset{(-0.52)}{0.04W_t} - \underset{(2.14)}{0.52Y_N} + \underset{(3.41)}{0.48eP_{int}} + \underset{(3.14)}{2.13}\left(1 + \frac{r_u}{100}\right)$$

$$DW = 1.936 \quad R^2 = 0.75 \quad SEE = 0.413$$

$$P_w = \underset{(3.14)}{0.39P_{ft}} + \underset{(2.17)}{0.21P_{ag}} + \underset{(2.32)}{0.12P_{it}} + \underset{(2.01)}{0.25P_{int}}$$

$$D.W. = 1.7231 \quad SEE = 0.002$$

$$L_t = \underset{(0.42)}{0.042} + \underset{(3.4)}{0.31P_w} + \underset{(2.05)}{0.24P_{w-1}} + \underset{(2.12)}{0.17P_{w-2}} + \underset{(1.82)}{0.13P_{w-3}}$$

$$DW = 2.214 \quad R^2 = 0.836 \quad SEE = 0.031$$

annual data for Nigeria are as shown in Table 1. Equations 1 to (6) except (5) constitute a simultaneous system that is linear in variables. Thus, equations (1) to (4) and (6) were estimated using the two stage least squares method. Equation (5) is not structural and is therefore estimated by ordinary least squares.

From equation (1) to (6), the information provided by the adjusted values of the coefficients of multiple determination (R^2), Durbin-Watson statistic (DW) and standard error of regression suggest that the equations are adequate representations of the data. The R^2 ranges from 0.69 for unorganised market rate to 0.836 for the cost of living equation. The Durbin Watson statistic ranges between 1.699 in the equation for unorganised market rate to 2.214 in the cost of living equation. The most important features of the empirical results are discussed below.

The sum of the coefficients in equation (5) is 0.97; therefore for a 1 per cent point increase in the rate of growth of food prices, industrial prices, agricultural prices and imported raw materials prices, the wholesale price index measured as the GDP deflator will increase by about 0.97%.

The result shows that the rate of change in the price of food is an

important factor in the determination of change in the wholesale prices. For a 1% point increase in the rate of growth of food price, the direct effect is 0.39 point increase in the growth of wholesale price. This in turn will affect the rate of change in the cost of living through equations (5) and (6). This result, in conformity with the structuralist theory, tends to suggest that inflation is propagated through increase in food price.

From the equations, a steady growth of $Y\%$ in wholesale prices would generate a rate of growth of 0.85 + 0.042 in the cost of living. A possible inference from this is that wages might be moving faster than the wholesale price in other sectors not included in our model.

The rate of change in money supply broadly defined, unorganised market rate, and rate of credit supply to the agricultural sector are important factors in the explanation of the rate of change in food price. For a 1% point increase in the rate of interest in the unorganised market, the direct effect is 0.69 point increase in the rate of growth of food price. The corresponding values in relation to money supply and credit supply are 0.15 and 0.26 per cent respectively.

The equation for unorganised market rate of interest (equation 2) shows that the rate of growth of money supply, foreign exchange reserves lagged one period and government expenditures are significant determinants of the unorganised market rate. Foreign interest rates have no discernible effect on the rates in the unorganised market in Nigeria, while foreign price of oil tends to depress unorganised market rates. This tends to suggest that government adopted expansionary monetary and fiscal policies for most of the period under review. However, this is a very weak tendency.

The coefficient of the cost of living in the wage equation (3) came out with a significant positive sign. The elasticity 0.67 tends to suggest that the labour market structure is such that money wages do not adjust instantaneously to maintain a consistent rate of change in real wages for a given excess demand even in a country experiencing a high inflation rate. Also, the moderating impact of unemployment in wage demand is obvious: the inverse of the beginning of period unemployment rate shows up with a significant positive sign. Non oil output production has no discernible effect on wages.

In the industrial price equation, wages exert no noticeable pressure. There is a strong and quick response to change in the Naira price of intermediate raw materials eP_{int}. This considerably complicate exchange rates management, because the exchange rate is a component of the Naira price of intermediate raw materials. Turning to the cost of credit variable, the result shows that the unorganised market rate has a strong impact on

industrial price. This result is quite consistent with our expectation that unorganised market rates play a large role in financing industrial production in Nigeria. This result seems to show that we have a downward sloping supply curve for non oil goods; the coefficient of Y_N in the industrial price equation is negative (– 0.52). This result may indicate gross underutilisation of installed capacity.

In a nutshell, our empirical analysis points to the importance of food shortage, Naira-price of intermediate raw materials and unorganised market rates in generating and fuelling inflation in Nigeria.

4. *Concluding Remarks*

The results of our analysis suggest that specific policies be undertaken to increase food supply in Nigeria as this is found to be a major factor in triggering inflationary cycles. This result has implications for the current macro economic policies being articulated in Nigeria to stem the rate of inflation. Macro economic policies such as credit control, monetary and fiscal policies will achieve little result in the presence of inadequate food supply. Otherwise, the situation may lead to increase malnutrition and poverty among the people. So, consideration may usefully be given to increase food production to complement orthodox stabilisation policies aimed at containing inflation in Nigeria.

APPENDIX

Sources of Data

Source A: International Monetary Fund, Various issues of *International Financial Statistics,* Supplement on prices, Supplement on output

Source B: Central Bank of Nigeria, Various issues of *Annual Reports and Statement of Accounts* and *Economic and Financial Review*

Source C: Federal Office of Statistics, Various Issues of *Annual Abstract of Statistics* and *Digest of Statistics*

Source D: FAO, Various Issues of *Production Yearbook Statistics*

Description of Variables

P_{ft} = food price index
Q_t = rate of change of domestic food production
M_t = rate of change in food import

r_u = interest rate in the unorganised market
W_t = rate of change in industrial wages (proxied by manufacturing wage index)
C_r = credit supply to the agricultural sector
r^* = foreign interest rate
P_o^* = price of oil
M_s^2 = money supply broadly defined
G = government expenditure
FER_{-1} = foreign exchange reserves lagged one period
Y_N = rate of change in non oil output
U_{-1}^{-1} = inverse of the beginning of period unemployment rate lagged one period
P_t = industrial price
$(1 + r_u/100)$ = interest rate in both organised and unorganised markets
eP_{int} = Naira price of imported intermediate inputs
P_w = wholesale price index (proxied by the gross domestic product deflator)
P_{ft} = rate of change in food prices
P_{ag} = rate of change in agricultural prices
P_{it} = rate of change in industrial prices
P_{int} = rate of change in prices of imported inputs
L_u = rate of change in the cost of living index – retail price index
P_{w-1}, P_{w-2} and P_{w-3} = wholesale lagged values
M_{SB} = money supply outside the banking system
M_{s-1}^2 = money supply broadly defined lagged one period

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OFFERTA DI GENERI ALIMENTARI E INFLAZIONE IN NIGERIA: UN APPROCCIO CON EQUAZIONI SIMULTANEE

La letteratura sulla dinamica dell'inflazione non ha dato molta attenzione all'influenza della scarsità di generi alimentari sulla pressione inflazionistica mentre in questi ultimi anni nella maggior parte dei paesi in via di sviluppo, specialmente africani, la spesa per importazioni di generi alimentari è aumentata moltissimo. In questo articolo viene sviluppato un modello delle interazioni fra le principali variabili nella formazione dei prezzi per verificare l'ipotesi che un'offerta inadeguata di generi alimentari è associata ad inflazione. Il modello – che usa dati della Nigeria per il periodo 1960-91 – sottolinea il ruolo del saggio d'interesse nel mercato monetario non organizzato sul comportamento di variabili come i prezzi dei generi alimentari e industriali. I risultati dell'analisi suggeriscono che si adottino adeguate politiche per aumentare l'offerta di generi alimentari in Nigeria poiché risulta che questo sia un fattore importantissimo nel determinare cicli inflazionistici.

LIBRI RICEVUTI (BOOKS RECEIVED)

CODICE PENALE DEL GRANDUCATO DI TOSCANA (1853). 1993, Padova, Cedam, pp. CLXXIII + VI + 186 + VIII + 80, s.i.p.

Fonti culturali ed eredità del codice penale toscano (*S. Vinciguerra*). – La codificazione penale nel Granducato di Toscana (1814-1860) (*M. da Passano*). – Appendice (a cura di *M. da Passano*). – Codice penale pel Granducato di Toscana (1853) (*ristampa anastatica*). – Regolamento fondamentale degli stabilimenti penali (1853) (*ristampa anastatica*). – Regolamento di polizia punitiva pel Granducato di Toscana (1853) (*ristampa anastatica*). – Le norme per l'applicazione del codice e le modificazioni successive (1853-1860).

DEL BONO Camillo: *Il distretto industriale del sughero in Gallura*. 1993, Sassari, Banco di Sardegna, pp. 184, s.i.p.

Presentazione. – Introduzione. – Sintesi e principali conclusioni. – Abstract. – 1. Il distretto industriale: elementi definitori, prospettive e quadro legislativo. – 2. La struttura produttiva del distretto del sughero in Gallura. – 3. La situazione finanziaria e l'andamento economico delle principali imprese del distretto del sughero: un confronto con l'industria regionale e nazionale. – 4. I fattori che hanno caratterizzato la trasformazione del sughero in Gallura negli ultimi anni e le prospettive che sembrano delinearsi. – Appendice. – Riferimenti bibliografici.

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Foreword. – Acknowledgment. – 1. Economic Development of the Arab Countries: The Basic Issues (*Said El-Naggar*). – 2. Economic Reform in the Arab Countries: A Review of Structural Issues (*Mohamed El-Erian* and *Shamsuddin Tareq*). – Comment (*Mustapha Kara*). – 3. Investment Policies and Major Determinants of Capital Flows to Arab Countries (*Ghassan El-Rifai*). – 4. Arab Capital Flows: Recent Trends and Policy Implications (*Ahmed Abisourour*). – Comment (*Samih Masoud*). – 5. Inter-Arab Labor Movements: Problems and Prospects (*Tayseer Abdel Jaber*). – Comment (*Mohamed Al-Amin Fares*). – 6. Environmental Policies and Sustainable Development in the Arab World (*Mostafa K. Tolba*). – Comment (*Salah El Serafy*). – 7. Human Development in the Middle East and North Africa Region (*Stephen P. Heyneman*). – Comment (*Badr Malalla*). – 8. European Economic Integration and the Arab Countries (*Rolf J. Langhammer*). – Comments (*Assia Bensalah Alaoui* and *Mabid Al-Jarhi*). – List of Participants.

GENE

L'ASSICURATORE

L'attività del Gruppo. Il Gruppo Generali prosegue nella politica di rafforzamento delle proprie posizioni nei diversi mercati di operazione, muovendosi lungo tre direttrici: riorganizzazione e razionalizzazione della presenza nei paesi di più antico insediamento; ingresso in nuovi territori che presentano interessanti potenzialità di crescita; proseguimento della politica imprenditoriale finalizzata alla crescita degli affari assicurativi attraverso accordi di ampia portata con importanti gruppi internazionali, supportata anche dall'acquisizione di qualificate partecipazioni azionarie di minoranza.
Rientrano in questo quadro gli accordi con il Banco Central Hispano di Madrid, con il Gruppo Fiat, nonché l'acquisizione del 3% del capitale della Banca Commerciale Italiana e la concentrazione della partecipazione nel Banco Ambrosiano Veneto presso la controllata Alleanza Assicurazioni. Per quanto più direttamente attiene al potenziamento delle strutture del Gruppo nei diversi territori, le operazioni più recenti hanno riguardato la riorganizzazione della presenza in Germania, Belgio e Argentina, la costituzione di nuove società in Portogallo e a Guernsey, l'inizio delle operazioni in Romania e nella Repubblica Ceca, il rafforzamento della presenza in America Latina: in quest'area il Gruppo ha infatti acquisito il controllo di una compagnia in Ecuador, ha rafforzato la propria presenza in Perù, dando vita a una nuova controllata che si pone al secondo posto sul mercato, ha acquisito un'importante compagnia in Colombia e ha costituito una società in Argentina destinata a gestire l'attività nel campo dei fondi pensione.

I DATI DEL BILANCIO CONSOLIDATO 1993

ATTIVO (in milioni di lire)	1993	1992
Beni immobili	10.445.896	9.850.122
Titoli a reddito fisso	48.282.042	37.629.752
Azioni e partecipazioni	10.559.561	8.918.159
Prestiti	4.470.835	3.813.236
Depositi di riassicurazione	711.164	757.034
Depositi bancari	4.085.556	3.750.037
Debitori diversi e altri attivi	9.215.736	8.296.748
Totale attivo	**87.770.790**	**73.015.088**
PASSIVO (in milioni di lire)		
Accantonamenti per impegni assicurativi	68.345.834	56.415.009
Depositi di riassicurazione	817.840	715.470
Altri passivi	7.280.410	4.834.352
Quote di terzi	2.377.046	2.219.121
Patrimonio netto	8.339.515	8.256.114
Utile dell'esercizio	**610.145**	**575.022**
Totale passivo	**87.770.790**	**73.015.088**

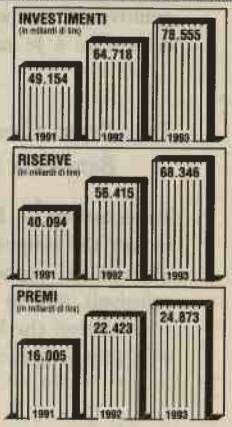
■ Sono state consolidate 86 compagnie di assicurazione operanti in una quarantina di mercati, 28 finanziarie, 21 immobiliari e 3 agricole.

■ L'utile d'esercizio è stato di 686,1 miliardi, a fronte di 675,7 miliardi dell'anno precedente; sul risultato hanno gravato per 151,4 miliardi le modifiche apportate ad alcuni criteri contabili, nonché imposte per un ammontare doppio rispetto a quello del 1992. La quota dell'utile consolidato di pertinenza della Capogruppo è di 610,1 miliardi contro i 575 miliardi dell'esercizio precedente.

■ I premi consolidati ammontano a 24.873,2 miliardi (+10,9%). Essi provengono per il 76,9% dai Paesi dell'Unione Europea (Italia 30%), per il 16,1% dagli altri Paesi europei, per il restante 7% dai Paesi extraeuropei. I premi raccolti nel ramo vita sono pari a 9.985,9 miliardi (+9%), nei rami danni a 14.887,3 miliardi (+12,3%).

■ Per prestazioni assicurative sono stati effettuati pagamenti per 12.938,8 miliardi.

■ Gli accantonamenti per impegni assicurativi sono aumentati di 11.930 miliardi.



■ I costi di produzione e di amministrazione sono ammontati a 6.006,5 miliardi. L'incidenza dei costi sui premi è risultata del 27,3%, in linea con il precedente esercizio.

■ Gli investimenti sono saliti a 78.555,1 miliardi contro i 64.718,3 miliardi del 1992 (+21,4%), con accantonamenti per impegni assicurativi pari a 68.345,8 miliardi.

■ I redditi degli investimenti hanno raggiunto i 6.323,4 miliardi contro i 5.329,9 miliardi del 1992 (+18,6%).

■ Il patrimonio netto complessivo risulta di 10.640,5 miliardi, di cui il 78,4% è di pertinenza della Capogruppo.

Il Gruppo Generali, oltre che in Italia, opera in Argentina, Austria, Belgio, Brasile, Canada, Colombia, Danimarca, Ecuador, Emirati Arabi, Francia, Germania, Giappone, Gibilterra, Gran Bretagna, Grecia, Guatemala, Guernsey, Hong Kong, Irlanda, Israele, Libano, Lussemburgo, Malta, Messico, Olanda, Panama, Perù, Portogallo, Principato di Monaco, Repubblica Ceca, Romania, San Marino, Singapore, Spagna, Stati Uniti, Sud Africa, Svizzera, Turchia, Ungheria.

ESERCIZIO 1993

RALI

SENZA FRONTIERE.

L'attività della Capogruppo. La Compagnia ha proseguito la propria politica volta al miglioramento dei risultati tecnici, attraverso una duplice azione indirizzata al risanamento del portafoglio assicurativo e al contenimento dei costi di gestione. Tale azione è stata condotta con particolare incisività sul mercato italiano dal quale proviene il 55% del volume d'affari complessivo e il 70% del lavoro diretto. L'adozione di una politica assuntiva attenta e selettiva e gli interventi di riforma del portafoglio in atto da tre anni, ma ulteriormente accentuati nel decorso esercizio, hanno permesso di conseguire una sensibile riduzione del rapporto sinistri a premi dei rami danni: grazie al contemporaneo rallentamento dell'incidenza dei costi, diminuita ancora di un punto percentuale, il risultato della gestione tecnica in Italia si è – per la prima volta dopo molti anni – avvicinato nuovamente al pareggio; ancora di segno negativo è per contro l'andamento del lavoro estero e della riassicurazione. Anche sul versante della gestione patrimoniale e finanziaria sono stati conseguiti risultati soddisfacenti, con una vivace crescita dei redditi correnti e – in presenza di un minor apporto rispetto all'esercizio precedente di operazioni straordinarie – con consistenti utili conseguiti nell'ambito dell'attività di trading svolta sulle principali piazze borsistiche internazionali.
In questo quadro, l'utile netto del bilancio 1993 è risultato superiore di oltre 30 miliardi a quello del 1992, e ciò dopo che talune modifiche ai criteri contabili hanno gravato il conto economico per 110 miliardi e dopo l'assorbimento di maggiori imposte per altri 111 miliardi.

IL BILANCIO 1993 DELLA CASA MADRE

(in milioni di lire)	1993	1992
Premi lordi	9.776.397	8.804.164
Premi ceduti	– 1.224.888	– 1.033.509
Premi netti	8.551.509	7.770.655
Redditi netti degli investimenti	2.481.619	2.121.330
Interessi tecnici gestione vita	– 1.498.016	– 1.258.052
Risultato della gestione tecnica	– 682.407	– 571.472
Proventi e oneri vari	– 127.715	– 36.439
Saldo della gestione ordinaria	**173.481**	**255.367**
Profitti da alienazione di titoli ed immobili	512.713	397.113
Utili di cambio	208.977	248.955
Minusvalenze da valutazione di titoli	– 185.384	– 349.004
Imposte dirette straordinarie	– 29.063	– 13.156
Saldo della gestione straordinaria	**507.243**	**283.908**
Imposte sul risultato	– 260.354	– 149.487
Utile dell'esercizio	**420.370**	**389.788**

■ L'utile d'esercizio è di 420,4 miliardi, contro 389,8 miliardi dell'esercizio precedente. Sul risultato ha gravato, per oltre 110 miliardi, l'effetto di talune modifiche apportate ai criteri contabili.

■ I premi ammontano a 9.776,4 miliardi, contro gli 8.804,2 miliardi del 1992, di cui 3.850,3 miliardi riferiti all'assicurazione vita e 5.926,1 ai rami danni.

■ Per prestazioni assicurative sono stati effettuati pagamenti per 4.906 miliardi.

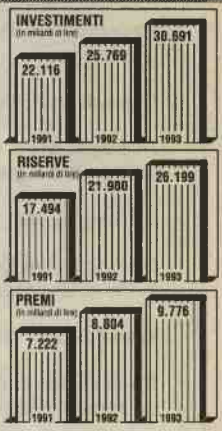
■ Gli accantonamenti per impegni assicurativi sono aumentati di 3.624,8 miliardi.

■ I costi di produzione e di amministrazione sono ammontati a 2.132,4 miliardi. L'incidenza dei costi sui premi è diminuita nel lavoro diretto italiano dal 24% del 1992 al 23%.

■ Gli investimenti sono saliti a 30.690,7 miliardi contro i 25.768,9 miliardi del 1992 (+19,1%).

■ I redditi degli investimenti hanno raggiunto i 2.481,6 miliardi contro i 2.121,3 miliardi del 1992 (+17%).

■ Il patrimonio netto raggiunge i 6.567,8 miliardi. L'eccedenza rispetto al fabbisogno minimo del margine di solvibilità è di 2.323 miliardi nel ramo vita e di 2.252,4 miliardi nei rami danni.



■ Il dividendo, al lordo delle ritenute di legge, è di Lit. 360 per azione.

■ In sede di Assemblea straordinaria gli azionisti hanno approvato la proposta d'aumento gratuito del capitale sociale da Lire 1.457,500 miliardi a Lire 1.603,250 miliardi mediante assegnazione di una azione nuova – godimento 1° gennaio 1994 – per ogni gruppo di dieci azioni vecchie possedute.

■ Presidente-Amministratore Delegato Eugenio Coppola di Canzano; Vicepresidenti Antoine Bernheim e Francesco Cingano; Amministratore Delegato Gianfranco Gutty.

Compagnie del Gruppo Generali in Italia: AdriaVita, Agricoltura, Alleanza, AssiBa, Aurora, Friuli-Venezia Giulia "La Carnica", La Venezia, Navale, SIAD, Trieste e Venezia, Risparmio Assicurazioni, Risparmio Vita, Unione Mediterranea di Sicurtà, Europ Assistance.

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